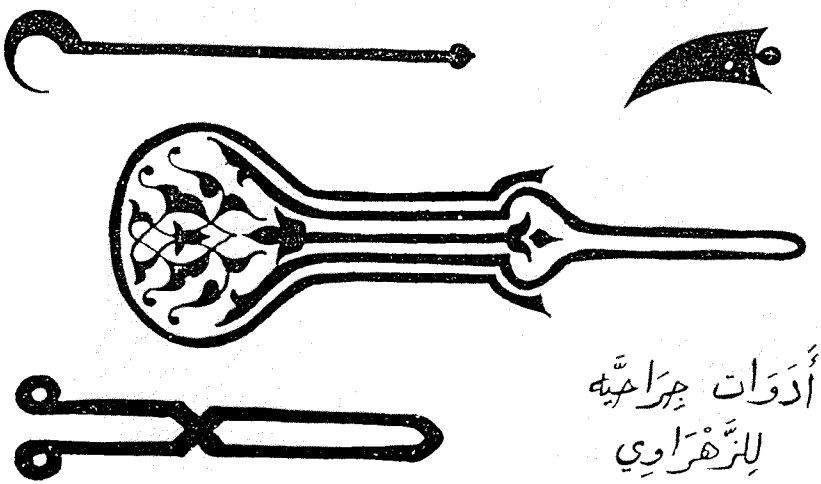
Creation/Evolution



Issue XXXIV **Summer 1994**

Articles

1 Islamic Creationism in Turkey
Taner Edis

13 Forbidden Archaeology
Wade Tarzia

26 What Inerrists Believe
Mark Isaak

29 A Survey on University Students' Understanding of the Place of Evolutionary Biology in the Creation/Evolution Controversy
Ronald K. Hodgson and Shu-ping C. Hodgson

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

About this issue . . .

ANTI-EVOLUTIONISM is not limited to a subgroup of Christians who argue that "scientific" creationism should be taught in public schools—or that evolution should not be taught. In this issue we look at antievolutionist movements in Islam and Hinduism; the latter case is fairly secular in nature, being based on the idea that modern humans have simply been around for 300,000,000 or more—no hairsplitting about Noah's Flood or young Earth geology! Wade Tarzia shows how anti-evolutionist arguments fit into patterns of pseudoscience and folklore. Readers familiar with the "standard" ICR, etc. creationist arguments will recognize their parallels from a quite different source which raves about "the vicious efforts of the Academic Establishment" (to quote the President of the Leif Ericson Society).

The Islamic case is specifically Turkish. The situation it describes may or may not hold true in other Islamic countries or cultures—Islam is not monolithic. As Taner Edis points out, the movement in Turkey is a "literalist" translation of Christian creationism a la Henry Morris and the Institute for Creation Research. Islam has traditionally been relatively "Old Earth Creation" in orientation, but this new alliance is not as odd as it might seem, since Islam, Christianity and Judaism share so many common religious ideas.

We also have a review of *Christianity and the Nature of Science,* a non-traditional antievolution book which avoids the doctrinaire trivia of many ICR-style arguments about scientific details. "Abrupt appearance theory" and "argument from design" sound seductively neutral to the casual observer—or harried school teacher.

The last (for now) of a series of articles reporting surveys of public and student attitudes about evolution comes from Hodgson and Hodgson at Central Michigan State. From the emerging picture of public attitudes, misconceptions and ignorance, it may be possible to focus better on how to improve science education rather than simply describe or bemoan the problem. It is clear, at least to me, that this is

continued on page 50

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Creation/*Evolution*

Volume 14 • No. 1 • Summer 1994

The journal of evolution and science education which explores aspects of evolution and antievolutionism

Contents

Articles

1 Islamic Creationism in Turkey
Taner Edis

13 *Forbidden Archaeology*: Antievolutionism Outside the Christian Arena
Wade Tarzia

26 What Inerrists Believe
Mark Isaak

29 A Survey on University Students' Understanding of the Place of Evolutionary Biology in the Creation/Evolution Controversy
Ronald K. Hodgson and Shu-ping C. Hodgson

Replies and Comments

38 Rejoinder to Bradbury
M. Landau and B. J. Landau

40 Amplification and Clarification
Karl Fezer

Reviews

43 *Christianity and the Nature of Science*, by Moreland
Reviewed by Neil A. Wells

47 *The Tree of Life; The Wonders of Evolution*, by Jackson
M. F. Walk

Correspondence

48

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Creation/*Evolution*

14(1), Issue 34, Summer 1994
ISSN 0738-6001
© 1994 by the National Center for Science Education, Inc., a not-for-profit 501(c)(3) organization under US law. *Creation/Evolution* is published by NCSE to promote the understanding of evolutionary science.

•

Eugenie C. Scott, *Publisher*
P.O. Box 9477
Berkeley, CA 94709-0477
(510) 526-1674

John R. Cole, *Editor*
c/o WRRC, Blaisdell House
University of Massachusetts, Amherst, MA 01003

Duane Jeffery, *Associate Editor*
Richard Trott and Laurie R. Godfrey, *Consulting Editors*

Deborah Ross, *Production Design*
Cover: Surgical tools from the cover of *Drawings and Pharmacy in al-Zahrawi's 10th-Century Surgical Treatise*, by S. Hamarneh, US Nat. Mus. Bul. 228, Paper 22, 1961

•

Views expressed are those of their authors and do not necessarily reflect the views of NCSE. *C/E* is published twice yearly in conjunction with *NCSE Reports*, a quarterly newsletter.

Address editorial correspondence to the editor. Style guidelines are available from the editor or publisher; 3 copies of unsolicited mss. are requested so that copies may be sent to referees, and return postage should be included if return of the ms. is desired. Write the publisher about address changes, missing issues, multiple issue or back issue purchases, reprint rights, etc.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Islamic Creationism in Turkey

Taner Edis

The December 1992 issue of *Acts and Facts* (of the Institute for Creation Research) describes a "Creation Conference" in October of that year in Turkey, featuring Duane Gish and John Morris, explaining how

> Sometime in the mid 1980s, the Turkish Minister of Education, Mr. Vehbi Dinçerler . . . placed a call to ICR . . . he wanted to eliminate the secular-based, evolution-only teaching dominant in their schools and replace it with a curriculum teaching the two models[.] As a result, several ICR books which dealt with the *scientific* (not Biblical) evidence for creation were translated into Turkish and distributed to all Turkey's public school teachers.

Islamic countries, Turkey in particular, are fertile territory for creationism. The religious-cultural need for a "scientific creationism" is not confined to conservative Protestantism.

A widely available, low-priced booklet (about 90 cents, 118 pages) by a leading Turkish creationist illustrates the nature of strict creationism in Turkey. *Evolution, a Bankrupt Theory* by Adem Tatli, (Tatli 1990), is also significant in that much of the included material was originally produced for the Turkish government. The level of reliance on the "creation science" produced by conservative Christians is striking.

From the preface by Ubeydullah Küçük, the publisher:

> [Western] civilization has turned its back on God and universal truths. . . . Among the demonic hypotheses this fundamentally flawed civilization—which has removed the concept and belief of the Creator God and replaced it with the idols of Man and this mortal life—has cursed humanity with, is Darwinism and the theory of evolution. Darwinism

Taner Edis received his Ph.D. in Spring 1994 from the Department of Physics and Astronomy of The Johns Hopkins University, Baltimore, Maryland.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and Marxism are two false religions coming into being in the 19th century. . . . Finally we are at the end of the game, Marx is finished, and so is Marxism . . .

Now, it is the turn of its biological sibling Darwinism, the hypothesis of evolution. This greatest scientific fraud of recent ages will also collapse. Recent discoveries and progress in the filed of molecular biology in particular, have exposed Darwinism and the atheist theory of evolution as a lie. But, just as old soldiers among Marxists are insistent on adhering to their false religion, Darwinists and evolutionists will also adhere to this pseudo-theory that agrees with their atheistic world view[.] However, it must be known with certainty that the defenders of Darwinism, transformism and atheistic evolutionary theory are fighting for a cause that is already lost.

Darwinism and evolutionary theory have given answers to origin questions that are unscientific, pessimistic, absurd, not in keeping with human dignity, and entirely in contradiction with universal absolute truths, and have thus become the opposite of wisdom.

From the Introduction by Adem Tatli:

At about the middle of the 18th century, the idea that all existent in the universe was the work of a Creator, and that present forms of life had continued without change, was widely accepted in the world of science. [Later], the idea that creatures came into being by chance, and that higher forms of life had appeared through changes in lower forms found wide support, led by Darwin. This idea, known later as "Darwinism" or "the theory of Evolution," began losing its value in the 1970's, or at the least, it was considered in conjunction with the idea creation.

The introduction then proceeds to describe how in 1985, the then Minister of National Education, Vehbi Dinçerler, asked Tatli to prepare an extensive report on the theory of evolution. Tatli recalls this comment of his to the Minister: "Darwinism, along with Marxism and Freudism, constitutes the basis of materialist philosophy. Your opposition to evolution theory may, I fear, lose you your position." The Minister's answer is said to be: "I feel the spiritual responsibility of 15 million children of the nation on my shoulders. The faith of our youth is shaken by the one-sided presentation of such a theory. For the truth of this matter to be understood and be set in its proper course, let not only one, but a thousand Vehbi positions be sacrificed."

Before discussing the "evolution Report" of the Turkish Education Ministry, some political background is necessary. Turkey is still in most aspects a secular state, though about 98% of the population is said to be at least

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

nominally Muslim. It may be that "scientific creationism" is a reaction to a fairly secular cultural environment. In the more traditionally religious and culturally rural parts of the country, evolution is simply not a concern.

The secular character of the state has been diluted, however, as in the right-wing military dictatorship period of 1980-83 and its aftermath, when there was more state entanglement with Islam. Religious instruction, in an orthodox Sunni (the main branch of Islam) sense, was constitutionally mandated for middle and high-school education. A 1983 report of the State Planning Organization, on the subject of a national cultural policy, endorsed the idea of a "Turkish-Islamic synthesis." Along with pseudo-history about the pre-Islamic culture of central Asian Turks, the report includes attacks against Darwin as an apostle of materialism (DPT 1983:539):

> Prominent among naturalist ideas that reduce humans to nature, count them as part of it, and deny human spiritual superiority that does not exist in nature, and cannot be derived from it, is Darwin [*sic*]. This biological hypothesis has declared humans to be of monkey origin, and asserted that the mechanistic workings of nature are completed with the last stage of evolution progressing from monkey to human.

The idea of national unity and internal peace being ensured by a relatively tame Islam was first put into action by the dictatorship, but the party that won the less-than-free elections of 1983 continued similar policies. One of its main factions was the religious conservatives, analogous to the Christian Right in the US, and they were given the Education Ministry. This party, which was regularly praised in the US press for its "pro-Western" policies, remained in power until 1991. The success of a more explicitly Islamicist party in the 1994 local elections means that the influence of religious conservatism in politics will continue.

In this context, here is the statement of the Minister, and a summary of the following "report on the Theory of Evolution":

> Dear Educator,
> As is known, the concept evolution (transformation—development) is a general way of thought. It is applied to all areas. The "Origin of Species" hypothesis that Lamarck (1744-1829) and Darwin (1809-1882) have propounded is an advanced application of this general idea to living beings. However, this hypothesis has caused extensive controversy in the world and in Turkey in the past two hundred years. It is the case that:
>
> a. It has not been possible for the theory to acquire law status until this day. (For example, we refer to the law of gravity, not to the theory of gravity.)

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

b. Opposing research and arguments intended to refute the theory have progressed beyond efforts to prove the theory.

c. Arguments and research to develop alternate theories continues.

The setting of such arguments in Turkey has in effect been in secondary and even primary education, related and supervisory institutions connected to these, and parents with children in secondary education. Experience has shown that discussion of the theory at this level has been divisive, misleading, undermining of trust in science or even having effects of implying an idea of conflict between science and religious opinions. In these aspects, these discussions have at the least not been of use to anyone.

And furthermore, that it would not be objective and scientific to exclude contrary opinions to "a theory that has not been able to become a law for 120 years" from textbooks, has been an issue that even our common citizens have given close attention to.

The following report advocates the inclusion in the curriculum of the shortcomings of this theory and opposing opinions. Please study the report, and relate all opinions in favor or against to the Training and Education Council [the body that decides textbooks and curriculum].

M. VEHBI DNÇERLER
Minister of National Education, Youth and Sports

The Summary of the Report:

According to Darwinism or the theory of evolution in its general meaning, a living creature has been formed by chance from unliving material, the various life forms of today have descended from that, and finally humans have come from monkeys.

Is there credible evidence for these claims? There is nothing but some interpretations and guesswork (p. 1-5).

Taking this into account, evolutionists proposed Neo-Darwinism. But it has been seen that this was not very different than its predecessor and has not been able to solve the problems (p. 5-8).

The evidence that evolutionists propose for evolution; mutation, embryologic evidence and vestigial organs, has been discovered to be without a serious basis and unable to produce a new kind (p. 8-16).

With both higher and lower organisms, fossil material demonstrating descent relations that evolutionists claim is nonexistent, as expressed by evolutionists themselves (p. 16-20).

It has been exposed by publications in this field that materials claimed to be related to human ancestors have been structured on fraud

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and speculation, and that no trustworthy fossil is in existence (p. 20-31).

The one-sided and insistent defense, in spite of all these short-comings, of the theory of evolution, is understood by efforts to use the theory for materialist philosophy, as explained by scientists who are authorities in this field themselves (p. 31-35).

To present this theory, whose incomplete and inconsistent aspects have been demonstrated by a large majority of scientists who are authorities about evolution, as a law, is at least not in keeping with the ideas of objective science.

It is our conviction that, in textbooks, it is necessary to provide all of the evidence in favor of and against the theory of evolution, and to leave the decision to the reader, in order for our youth to gain the habit of objective and scientific thinking.

The body of the report contains depressingly familiar creationist arguments. Emphasis of mere chance, statistical impossibility claims, out of context quotations, assertions of the lack of transitional fossils, bogus taxonomy, conspiracy theories supported by Piltdown and Nebraska Man, condemnations of dogmatic materialism—an impressive display of the worst of creationism is packed into the report. The person presented throughout as an authority of evolution is, of course, Duane T. Gish of the Institute for Creation Research.

The concluding section attacks Turkish biology textbooks of 1979 (just before the military coup) for daring to support human evolution, declaring that life had "with a large probability" originated without outside intervention, explaining that new species more often arise from less specialized forms rather than highly adapted species, describing skeletal changes in hominid evolution, and similar intellectual crimes. There are said to be claims based on preconceived notions, without evidence, as seen by the confessions of researchers themselves.

The final recommendation, curiously enough, is a form of equal time. This is likely accounted for by the observation that the authors' dependence on Christian creationist sources is so extensive as to unquestioningly adopt their strategy, also. The conditions in just post-military rule Turkey were such that this compromise was unnecessary; biology textbooks could be watered down so as not to contradict the creationism appearing in the religion courses. The 1979 text does not reflect the present situation. Though an extreme example, in the late 80's Turkey had a biochemistry textbook used in a state medical school that took time out from reactions to become reactionary: urging students to live a properly Islamic life, describing the "respect, worship, faith and prayer centers of the human brain," etc. (Yegin n.d.:118).

The list of 90 footnotes is illuminating. Twenty-two are to fairly well-known "scientific creationist" sources, such as "Gish, D.T.; *Evolution: The*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Fossils Say No!; translated by Adem Tatli, 1984," Field, A.N.; *The Evolution Hoax Exposed*, 1971; translated by H. Avanoglu, 1976," "Macbeth, N.; *Darwin Retried* [in English], 1971," and such.

The few (about 5) Turkish references are to old biology-related textbooks where the authors appear to have expressed creationist-like convictions. Most of the rest are to semipopular or technical scientific literature, in many cases clearly identifiable as being out of context, others being out of date by decades—many from the 1920's to the 1950's. In fact, it is fairly obvious that these references themselves are obtained through the Western creationist literature.

Following the Ministerial Report, the creationist book includes a Gish article, "Creation, Evolution, and Public Education," which was officially translated by the same ministry.

The third and final part of the book is a collection of seven articles by Dr. Tatli (there is no information within as to Dr. of what); presumably previously published in the popular religious press, to which Tatli contributes regularly. Some highlights:

1. "Biology Textbooks Must Be Rewritten . . . ": Controversy about details of human evolution is used to give the impression that new hominid fossils have disproved evolution. The confessions of evolutionists are paraded; manufactured, as usual, through context-free quotations.
2. "The Evolution Scandal": An argument from fraud, claiming evolution is a pseudoscience.
   Of course, scientific evidence was needed for this claim [that there is no Creator and all is a product of nature and chance]. The duty of finding the necessary evidence was given to the theory of evolution. All similarities between living beings, all organs with unknown functions, all creatures with uncertain structure were harnessed for evolutionary theory. And it labeled all these as "evidence for evolution." But unbiased scientific work, and research without ideological and preconceived conclusions, did not support the claim of evolution theory. This is because every creature, like a letter, is written by a pen of divine power with the elements in the universe. Those who desire to conceal the author of these letters used *fraud* as a last resort.
   The Piltdown fraud is mentioned, and Peking Man is claimed to be fraudulent. *Archaeopteryx* is called a hoax, but curiously, the basis for this is a reference to a 1987 article in the venerable humor magazine *Punch*, not Hoyle and Wickramasinghe.
3. "Darwin Must Rely on Luck": Some recent ideas on the role of sheer luck ("survival of the luckiest") in evolution is used to ridicule the theory. Then, to bear witness that "in all in existence, signs of infinite

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

knowledge, will, power and capability are seen," and to object to "scientists explaining these with luck and chance," two recent Western books are discussed: the French biologist Remy Chauvin's *Dieu des Fourmis, Dieu des Etoiles* (The God of Ants, The God of Stars), and the Australian Michael Denton's *Evolution: A Theory in Crisis*.

4. "The Creation Model"; Explanation of creationist "kinds" and how in the creation model variation is confined to "the genetic potential" of each kind. Based entirely on Duane Gish's *Evolution: The Fossils Say No!*, and W.E. Lammerts' "The Galapagos Islands Finches" in the 1970 book *Why Not Creation?*
5. "Why the Dogmatism of Evolution?": Quotes creationists A.N. Field and G. McCready Price, and biologists from the 1920's and 30's, on how evolution has become the orthodoxy through propaganda. It is claimed that Turkish scientific circles also treat evolution as an untouchable truth, which is not the case today.
6. "Evolution and Ideology": This starts out with "Darwinism and Neo-Darwinism have been used to serve *capitalism* and *racism* in the past century."

   > For example, The Englishman Herbert Spencer, who was an influential evolutionary philosopher and sociologist, strongly defended the idea of Social Darwinism [applied by robber barons and imperialists]. In Germany, the racist evolutionism of persons such as Haeckel, Nietzsche and Bismarck later gave birth to Adolf Hitler's Nazism.

   However, the Islamic religious right is much more anti-communist than anti-capitalist. So the bulk of the article is devoted to showing the connection of evolution to godless Communism, with references to sources such as the *International Socialist Review* and *Marxism Today*.

   > [Marxists] paid respect to Darwinism because it gave scientific respectability to naturalistic and atheistic opinions. But what they wanted was not a slowly progressing evolution, but in contrast, a change that took place faster.

   Eldredge and Gould's theory of punctuated equilibrium is then brought up, with the implication that this surfaced to cater to the need of communism for rapid change. It turns out that this bizarre form of Red-baiting is also inspired by American creationism; a reference is made at the end of this section to "H. Morris, *Evolution in Turmoil*."
7. "Modern Life in Ancient Societies": Evolution being seen as a general philosophy beyond biology, social evolution is the topic. By misrepresenting current criticism of older, simplistic linear cultural evolution notions, it is asserted that no evidence exists that humans ever had anything but rather modern social features.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The creationist view of cultural development is given as:

> Creationists accept that humans are created as humans and with a high intelligence, and wide ranging ability and capacity. *Doubtless humans have not come into a world with built cities and a developed technology in all its aspects. But the Lord God has given him an ability to use and develop the resources of the earth, and equipped him according to the purpose he was sent to the world.*
>
> [Humankind has progressed,] [b]ut it should not be forgotten that the foundations of this culture and civilization have been laid by the miracles of the prophets [of God].

The existence of religious belief itself is brought to count against evolution:

> When evolving humans from animals, it must not be forgotten that they have, in contrast to animals, concepts of morality, idealism and religion. *How will evolution explain the moral values that come from the created nature of humans?* How has the emotion of faith developed in humans? [. . . Human] differences show that they are perfectly created with their own special nature and for a purpose.

The booklet ends with an advertisement for another, full color, illustrated and detailed creationist book "dealing a death blow to modern atheism."

Perhaps the most striking feature of this example of Turkish creationism is the extent of almost total dependence on Christian creationists. Perhaps this should be expected, as Turkish intellectual life tends to lag behind the West in general. The weak state of Turkish science (Turkey has been reported to have 12 thousand scientists, the most of any Islamic country; the Islamic world is said to have a total of only 45 thousand overall, out of a population of about a billion [Yldrm 1993]). This may have a connection with the prevalence of imported pseudoscientific beliefs. But probably the major factor is that a segment of society has more recently felt the need and the possibility to respond to the pressures of secularism, and not be retreating into a traditionalist isolation. Islamic fundamentalism, like its Christian cousin, is a product of modernity in its very reaction to it.

Christian creationism was there, accessible, and easily adaptable. The religions are remarkably similar, as far as the Creation mythology is concerned. Differences exist between the literal creation stories of the *Qur'an* and *Genesis*, but these are details that very rarely come up in the creationist literature, if at all. The usual vague "creation model" is fully compatible with Islam.

Islamic creationists are more likely to be day-age, Old Earth creationists; accepting *Genesis* only as a corrupted version of the original message of God to the Hebrews. The *Qur'an* account is relatively vague, even as to the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

number of days of creation: while most have the conventional six, one ambiguous passage adds up to eight. Also, in various verses, the "days of God" are taken to be a thousand (*Al-Hajj* 47, *As-Sajdah* 5) or even fifty thousand (*Al-Ma' arij* 4) years in length, though these are in different contexts than creation. So forcing the text into a day-age interpretation is somewhat easier for the Islamic case. They also don't have to worry as much about the stated *order* of creation in the *Genesis* story, as little is said about this matter in the *Qur' an*.

Contemporary Islam in general has a greater tendency towards literalism than Christianity regarding its sacred texts. The *Qur' an* is taken by almost all Muslims, conservative and liberal, as being the *direct and unaltered* word of their God. The historical conditions being such that many Muslims feel culturally threatened by a powerful and intrusive West that is more technologically advanced, there may be less of an opportunity at the present to develop analogues to nonliteral modernist theologies. Since science is indispensable in order to emerge from backwardness relative to the cultural competition, and religious identity is nonnegotiable to large degree, creationism can be an attractive compromise. Science must validate, not threaten, the revealed truth.

The popularity of all kinds of pseudoscience in Turkey is remarkable, but this has not spawned any generalized skeptical movement in response. The limited opposition to creationism takes place in the context of an overall criticism of Islam. In recent years the Islamic religion has increasingly been a basis for political action, so its critique also has a political flavor. Leftists who see a strengthening orthodox religion as a barrier to progressive change are among the foremost Turkish critics of Islamic creationism, treating it as yet another sign of the unscientific character of Muslim belief.

While I have seen a reference to a book called *Science and Creationism* (by title alone; perhaps the one edited by A. Montagu 1984) as having been translated into Turkish, more accessible anti-creationist sources are articles and sections of books by critics of Islam. There have been a number of books critical of religion published recently, some by socialists who were political prisoners in the early 1980's and had access only to religious material in the prison libraries. Unfortunately, they tend to successfully address already culturally modernist segments of society only and reinforce the religious right's identification of evolution with atheism.

A recent example is the book *The Truth About Islam* by such a self-described ex-prisoner of conscience, Erdogan Aydn (1992). Its second volume is an exercise in confronting literalist Islam's blatant contradictions with present scientific understanding. One chapter is devoted to an examination of creationism. On the politics of creationism:

> The American New Right in the 80's, through reactionary institutions such as the Institute for Creation Research etc., produced widespread

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

publications aiming to present the myth of creation as a serious claim and spread doubt about evolution; with direct support of the US and satellite states, this antiscientific effort was [promoted relentlessly]. What Muslim ideologues have done at this point (without neglecting to attack Christianity), is to [depend upon] Christian researchers on the subject, translate them directly or steal their claims without feeling the need to provide citations. . . .

. . . This antiscientific tendency was met with opposition by the most respected US scientists and institutions, the science-cloaked new claims of the creationists were refuted once more, and it was underlined that creation claims could not appear at any level in science education. In the following process, the American Supreme Court decided to stop the practice of the imposition of creation theory on schools.

Without a doubt, the same will not take place in our country as easily as in the USA. Even though a strong institutional counter-rationality is present as a reflection of the dominance of [Big Business], institutions of science have also acquired [significant power]. Unfortunately, the same cannot be said for our country! Furthermore, our democratic [sources of power] are vanishingly weak, and in contrast, archaic judgments and institutions are extremely potent . . .

Aydn's defense of evolutionary concepts does not provide anything novel, and it is partially out of date. It is clear that he has not been able to follow the evolution side of the Western creation/evolution controversy. Most of the creationist claims he responds to are taken from the Islamic apologist H. Nurbaki's book *Ayet's from the Qur'an and Scientific Truths* (Nurbaki n.d.). Nurbaki is one of the Islamic creationists particularly difficult to take seriously, with statements like

The guesses about the time of our world's creation can never go beyond being mere claims. Therefore such information is not a theory, or even a hypothesis. Of course it is possible that these years are very many. However, we can never know the speed time flowed in those times. With this opportunity, we would like to remind our readers that ideas about the time of creation of the earth and the universe can never contradict the *Qur'an*.

Among all this, there still are some religious leaders who think an accommodation with evolutionary theory may be reached. The influential theological moderate Süleyman Ate interprets certain ambiguous verses of the *Qur'an* to mean that evolutionary theory does not contradict the religion or scripture. "The *Qur'an*, which points to the origin of humanity in various places, shows that this creation was made subject to development. . . . How this development takes place only God knows." In his book *This is True*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Religion Ate (1991:228) begins by interpreting the days of creation as ages. The argument is rather forced, and ignores verses (e.g., *Ha Mim As-Sajdah* 9; "day" is sometimes translated as "span" in English versions that assume a day-age harmonization) in which the shortness of time might emphasize the greatness of God. However, scriptural interpretation is always vague, so there is at least room for a more accommodating view.

There are also those who claim a form of directed evolution ("Evolutionary Creation") as being Islamically acceptable, relying mainly on interpretations of Islamic philosophical speculations in the 9th to 11th centuries (Bayrakdar 1987). While this is contrasted to modern evolutionary theories that are non-teleological, it provides a basis for a high degree of acceptance of descent by modification.

But the hope that Islamic versions of theologies that are not directly hostile to evolution can be popularly accepted must remain dim. Science does get respect, in its technological aspects—engineers in particular are prominent among culturally conservative leaders (this is also true where Arab countries are concerned [Sivan 1985:81]). But the traditional understanding of the religion sees evolution as reducing humans to animals, so "scientific" creationism serves a vital religious function. The general framework of a "cultural traditionalist" group, with leadership provided by conservatives within the sociological "New Class," broadly serves, in the Turkish case as well as the US, to analyze creationism (Eve and Harrold 1991).

Creationism also has to be understood in the context of the general apologetic activity directed against Western secular influences. Islam is pronounced to be a "scientific religion" in all its details, and those such as the French surgeon Maurice Bucaille who claim that the *Qur'an* is the only scripture in full agreement with modern science (Bucaille 1982) get a lot of attention. The harmonization of scripture and science goes to the lengths of claiming "*Qur'anic* miracles," with certain verses interpreted as having anticipated modern science in the 7th century (Moore 1986), an activity reminiscent of the exegeses of Nostradamus. It is not surprising that the same sources would also take easily to "theory but not fact" rhetoric to preserve the perceived scientific integrity of the *Qur'an*.

It would seem that Turkish creationism can be held in check only with the support of some liberal form of religion; a mode of argument that is scientific alone, with no reference to religious belief, will probably not be sufficient in the current political context. But the prospects of this taking place are not good, particularly with the rising political and cultural force of orthodox religion; and modernist intellectuals have been bemoaning the resistance of Islam to any reform for more than a century now. Whatever the fortunes of Christian creationism, the Islamic world will be increasingly important in the future for creationist pseudoscience.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

References

Ates, Süleyman. 1991. *Gerçek Din Bu*, vol. 1. Istanbul: Yeni Ufuklar Neriyat.
Aydn, Erdogan. 1992. *Islamiyet Gerçegi*, vol. 2. Istanbul: Güney Yayincilik.
Bayrakdar, Mehmet. 1987. *Islam'da Evrimci Yaradilis Teorisi*. nsan Yayinlari.
Bucaille, Maurice. 1982. *The Bible, The Qur'an and Science*. Paris: Seghers.
DPT (Devlet Planlama Teskilati). 1983. *Milli Kültür Raporu*. Ankara.
Eve, R. and F. Harrold. 1991. *The Creationist Movement in Modern America*. Boston: Twayne Publishers.
Montagu, Ashley. 1984. *Science and Creationism*. NY: Oxford University Press.
Moore, Keith L. 1986. A Scientist's Interpretation of References to Embryology in the *Qur'an*. *The Journal of IMA*, Vol. 18 p. 15.
Nurbaki, Haluk. n.d. *Kur'an'dan Ayetler ve lmi Gerçekler*, vol. III. (Aydin does not provide publication information)
Sivan, Emmanuel. 1985. *Radical Islam: Medieval Theology and Modern Politics*. New Haven: Yale University Press.
Tatli, Adem. 1990. *Evrim, Iflas Eden Teori*. Istanbul: Bedir Yayinevi.
Yegin, M. Münip, et al. n.d. *Biyokimya I*. Ankara: Atatürk Üni. Yayinlari No: 653. Discussed in Vecihi Timuroglu, *Türk-Islam Sentezi*, Ankara: Basak Yayinlari, 1991.
Yildrim, Emin. 1993. Study described in the newspaper *Cumhuriyet Hafta* of Feb. 11, 1993.

C/E

Issue 9
- Dilemma of the horned dinosaurs
- Old time religion and the new physics
- Six "Flood" arguments creationists can't answer

Issue 10
- True vestigial structures in whales and dolphins
- Whales and evolution
- The turtle: A creationist shell game?

Issue 11
- The impossible voyage of Noah's Ark (special issue)

Issue 12
- Genesis knows nothing of scientific creationism
- Scientific creationists are not *catastrophists*

Issue 13
- Design in nature: a debate
- Space dust, the Moon's surface, and the age of the Cosmos

Issue 14
- Creationists, population growth, bunnies and the Great Pyramid
- But some of them *are* scientists, aren't they?

Issue 15
- Paluxy River footprints (special issue)

Issue 16
- The fossil record of Perissodactyls
- "Nebraska Man"

Issue 17
- "Scientific creationism" and error
- Humans contemporary with dinosaurs?
- Sociology of the creationist movement

Issue 18
- Evolution and testability
- What did Karl Popper really say about evolution?

Issue 19
- Creationists and the human fossil record
- Plagiarized errors and molecular genetics

Issue 20
- A creationist tour of the Grand Canyon
- Fossil insects: pests of creation
- *Punctuated equilibria* and the origin of species

Issue 21
- Morality, religious symbolism and the creationist movement
- An astronomical critique of Biblical chronology
- Creationist footprints on the Paluxy—the trail continues

Issue 22
- Creationism and the New Right agenda
- Polonium halos mystery—unsupported by geology

Issue 23
- Caves and evolution
- Creationist misquote Clarence Darrow
- Mesopotamian archaeology and "The Flood"
- Polonium halos book review

Issue 24
- Gap theory
- "Scientific" creationism not literalist but extra-Biblical
- Evolution of Tennessee Antievolutionism

Issue 25
- Scientific creationist zeal usually leaves scholarship behind, says evangelical scientist
- Creationist Walter Brown debate exchange

Issue 26
- Protein sequences and Denton's error
- *Fossils, Po* halos and the Colorado Plateau

Issue 27
- Creationism and archaeology
- Folkloristic analysis of creationist rhetoric

Issue 28
- A "Transitional forms" checklist
- Evolution of improved fitness by random selection
- Bobbing for dinosaurs: forensic science and the Flood

Issue 29
- Afrocentric Creationism
- Random Protein Formations and the Origin of Life

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Forbidden Archaeology: Antievolutionism Outside the Christian Arena

by Michael A. Cremo and Richard L. Thompson

Wade Tarzia

Forbidden Archeology, a new Bhaktivedanta Institute book, argues that anatomically modern humans have existed for hundreds of millions of years, disproving the theory of human evolution; it makes no specific claims about other kinds of biotic evolution. The book also claims that archaeologists have become a "knowledge filter" (p. xxv ff.) since the 19th century, laboring under a predisposition to ignore evidence for anatomically modern humans having existed for millions of years. Sometimes the book develops a dishonesty theory—evidence is said to be "carefully edited" (p. 150) by scientists so that younger investigators do not see evidence that invalidates the theory of human evolution.

The authors have worked hard in collecting and quoting an enormous amount of material, most of it from the 19th- and early 20th-century, certainly interesting for its historical perspective. Their evidence is as diverse as it is detailed, including, for example, "eoliths" (crudely broken stones some have considered early tools), "wildmen" (Bigfoot, etc.), and even a fossilized shoe sole from the Triassic period.

Despite all this hard work, I think the book falls short of a scientific work primarily (but not entirely) because (1) its arguments abandon the testing of simpler hypotheses before the more complex and sensationalistic ones, and (2) the use of so many outdated sources is inadequate for a book that seeks to overturn the well-established paradigm of human evolution—scholars must not work in isolation, especially today, when multi-disciplinary ap-

Wade Tarzia holds a Ph.D. in Comparative Literature and Folklore and is working on a book on Beowulf. He is currently a writer/editor at the University of Connecticut/Storrs School of Engineering.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

proaches are needed to remain on the cutting edge of knowledge. However, for researchers studying the growth, folklore, and rhetoric of pseudoscience, the book is useful as "field" data.

I confine my review to some basic categories of flawed scientific argumentation. I show a couple of examples in each category but by no means have exhausted the pool. Throughout the book, examples of "loose" science appear. I hesitate in judging the book to be utterly worthless from a scientific standpoint—as I said, various specialists need to compare notes on the book—but if good ideas exist in *Forbidden Archaeology*, they are hidden under a mass of undisciplined details, lack of critical contextual information, leaps of logic, and special pleading. The authors would have done better to devote their years of research to a smaller list of topics to allow themselves space to consider and test all of the implications of their hypotheses.

Forbidden Archaeology is so expansive that it forms good ground on which to explicate the style of pseudoscientific writings, especially on the topic of archaeology. It is an exhaustive attack on the idea that humans have evolved. It is also a well-written example of pseudoscience—it *looks* like the real thing, a phenomenon discussed in Williams (1991:15)—and a quick review of the book is not possible. Serious treatment of new ideas, however much on the fringe they may be, is an appropriate venture in science. "The idea is not to attempt to settle such ideas definitely, but rather to illustrate the process of reasoned disputation, to show how scientists approach a problem that does not lend itself to crisp experimentation, or is unorthodox in its interdisciplinary nature, or otherwise evokes strong emotions" (Sagan 1979:82).

Mass of Details

The mass of details with attached analyses would require book-length responses from specialized reviewers to confirm or critique. This style is a common diversionary tactic in pseudoscience. Since the authors have not aired their arguments previously through professional journals, as many scholars do before writing such a huge synthesis of material, the task of validation becomes a career itself. Such a style burdens an analysis with long leaps between broad assumptions (i.e., scientific cover-up) to the detailed evidence (i.e., minutiae of strata and dating from obscure sites)—all on the same page.

In the process of amassing details, the book seems to go to great length on minutiae, while more important data are passed over. Example: in a discussion of a purportedly incised bone (p. 38-40), discussion of the nature of the cuts and the context of the bone in the site are given short shrift while the discussion focuses on the fauna appearing in the stratum of the find. Evidence from an electron microscope study is not yet forthcoming; additionally, a reference central to the issue is a personal communication, and other evidence in the form of drawings or photographs is lacking. We are diverted from the primary issue of *whether it is an artifact at all*. A discerning

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

reader simply needs more than this to credit unusual claims for controversial artifacts.

Over-use of Old Sources

Quotations from the 19th-/early 20th-century are copious— comprising, I would guess, at least 25 percent of the book. A few examples: (1) a 1935 work of Weidenreich is cited as opposition to a 1985 work of Binford and Ho (p. 553); was there no current reference to refute Binford and Ho, and if not, what does this mean? (2) a question is raised about the geological time-scale, and the latest reference on the matter cited is a lecture given by Spieker in 1956 (p. 16); surely additional and more recent work is available on a topic as important as this; (3) the authors cite a 1910 work of Osborn that mentions archaeological work done in 1863 and 1867, which seems like desperately searching for supportive evidence in old reports; (4) experts are cited—from ca. 1870—on the subject of shark teeth to suggest that these Pliocene fossils were drilled by Pliocene humans (p.49-51); this case is conspicuous in its avoidance of modern sources on shark biology and paleontology, sources that might better elucidate the work of tooth decay, parasites, and fossilization at work on shark teeth.

I do not indict the sincerity and ground-breaking work of 19th century scholars. However, because knowledge seems to accumulate and research techniques seem to improve, assuming a blanket equivalency of research level between 19th and late 20th century science is just going too far.

Rusting Occam's Razor

A major flaw of *Forbidden Archaeology* is its quick leaping toward sensational hypotheses (see in general Williams 1991:11-27). Sensational ideas are not intrinsically bad—plate tectonics was pretty astonishing at one point (Williams 1991:132), but also true. However, the cautious investigator hopes that less sensational, or simpler, hypotheses are first proposed and well tested before more complex or less likely explanations are considered.

> This jumping over possible explanations is what Dincauze (1984:294) calls avoidance of alternatives in archaeological argumentation. Dincauze fairly draws her cases from an array of archaeologists, some professional, others on the fringe. Her cases are drawn from the controversial claims for pre-Clovis (pre-12,000 BP) Paleoindian occupation in the Americas, but her ideas perfectly suit this current review. Dincauze writes, Critical tests must be applied to each and every claim for great antiquity so long as there remains no supporting context of ancient finds in which the claims can be readily accepted. . . . We have at hand an unprecedented number of powerful analytic techniques.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

> Because of the expanded base of theory, data, and method, we should be able to define related series of contrastive hypotheses around any question. Given multiple hypotheses, we can proceed to exclude or disprove all of but a few of them, leaving those that are not contradicted.

Consider the famous fossilized foot prints at Laetoli, Tanzania, dated to about 3.6 million years BP. Most scientists agree they were made by hominids. Since the footprints are surprisingly familiar, Cremo and Thompson feel they are direct evidence for 3.6-million-year-old *modern* humans (p. 742). Yet, one can more easily see the footprints in light of a main point of evolutionary theory—if parts of an organism are well-adapted to certain uses, selection pressure for change would be absent. Thus human feet may be relatively well-adapted to walking and need not have changed rapidly over a few million years. So far this seems to be the simplest explanation. *Forbidden Archaeology* has not offered an alternative that falsifies this concept nor proposed a better one.

Reference to reports of living ape-people (or "wildmen") caps my list of giant leaps. *Forbidden Archaeology* uses this section to suggest the simultaneous existence of ancestral hominids with modern-type humans (cf. 622) (which would supposedly disprove the notion of human evolution, ignoring the possibility of shared common ancestry). The authors seem very credulous of reports of wild-folk sightings. Here the easiest explanation, in the absence of a caged abominable snowperson, is that Yeti, Sasquatch, etc. are manifestations of folklore about anthropomorphic creatures, which is spread worldwide and goes back quite far; the human-eating monsters Grendel and his mother in the 1,000+ year-old epic Beowulf are examples (see Donaldson 1967). In fact, some of the reports cited in *Forbidden Archaeology* remind me of Beowulf when the theme of the report is an attack of an ape-man (examples on pp. 610, 611, 614, 618). The nature of some reports reminds me of contemporary legends in which the actual witness of a strange event is removed from the informant by space and time; one informant said, "Many years ago in India, my late wife's mother told me how her mother had actually seen what might have been one of these creatures at Mussorie, in the Himalayan foothills" (p. 607).

Discussing wildmen existing in folklore, the authors cite a reference that says, in part, that wolves appear in folktales because they are real; so if wildmen did not show up in folktales, then their reality could be doubted (p. 617). Well—dragons, giants, and vampires show up in folklore; are we to believe they are real? But chipmunks seldom appear in folktales, so perhaps they are mythical? Asking simple questions such as these help us make a "reality check" on arguments. As a folklorist, I need to see the folklore hypothesis first discussed and soundly falsified before I consider that Yeti is real. And as a person interested in science, I also need to see a sound

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ecological defense of their lifestyle; as Williams says, "[T]here is a world-wide belief in human-like monsters, often lurking in the unknown woods. ...we've got them everywhere we want them—but conveniently they don't take up much space and eat very little" (Williams 1991:17).

Missed Evidence

While presenting a voluminous amount of detail, sometimes *Forbidden Archaeology* overlooks important points. For example, the book discusses the Timlin site in New York, where researchers reported finds of tools dated to 70,000 BP (p. 354). Yet *Forbidden Archaeology* does not mention the responses to these claims by several professionals which cast the nature of these finds in doubt (Cole and Godfrey 1977; Cole, Funk, Godfrey, and Starna 1978; Funk 1977; Starna 1977; a reply to the criticisms is in Raemsch 1978). I found it interesting that a student created similar "eoliths" by rattling the same source material in a garbage can (Funk 1977: 543); this simple experiment has much to say about eoliths!

The authors have also missed Dincauze's (1984) work which analyzes the flaws in theorizing about bones and artifacts from alleged early man sites. The flaws in logic, artifactual context, and hypothesis testing (or lack of it) that she discusses are perfectly applicable to arguments on eoliths and alleged incised bones, and her discussions include some of the very sites referred to in *Forbidden Archaeology* and the problems associated with them.

In addition, the book appears to miss the point that conclusions drawn from the paleoarchaeological record rely heavily on the context of evidence found from a variety of sites. When an artifact or fossil has a good context, it has been found among other evidence of cultural activity and has been dated by more than one method. The artifact might be found in concentrations of other artifacts at a butcher site comprising the bones of an animal. Such a context supports a claim that simple tools, comprising rather crudely chipped cores and flakes, were indeed tools. Similarly, the dating of the remains should rely not only on a chemical method but also on other contexts, such as datable fossil remains of other life (Dincauze [1984:301-305] discusses these issues; see Mania and Vlcek [1981:134] for an example in use: testing amino acid racemization, geological strata, and faunal analysis).

Problems of missing context plague eolith arguments. Thus, the authors state that crude eoliths are not accepted as tools whereas allegedly similar-looking artifacts (such as Oldowan and Acheulian industries) discovered by professional archaeologists are accepted as artifacts (p. xxvii). But many Acheulian artifacts and quite a few Oldowan artifacts are quite distinctively styled—impossible to confuse with randomly-broken eoliths.

Furthermore, Cremo and Thompson think that Oldowan tools cannot be accepted as tools because they were not found near hominid fossils (p. 154). This chain of logic continues: if one rejects eoliths as tools, then one must

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

also reject Oldowan tools, which dismisses most of the tools from East Africa and Zhoukoutien in China (p. 188); or—take your choice!—in the absence of hominid remains, Acheulian artifacts could be attributed to *Homo sapiens* (p. 410). In some cases the authors may be correct—some of the early finds at Olduvai that have no supporting context may indeed be shaky evidence. Beyond this, however, *Forbidden Archaeology* builds a shaky correspondence between the alleged evidence of eoliths and the accepted hominid and tool finds. First of all, archaeologists do not fail to question their data, a fact that *Forbidden Archaeology* conveniently fails to mention at strategic points. A cursory library search introduced me to Walker (1981:198-201), who notes that the dating, surface-find context, and sample sizes of hominid finds present currently unsolved problems (although, on the other hand, Walker emphasizes that surface finds, under certain defined conditions of context, can offer reasonable evidence [p. 200]). On the same stroll I found Rightmire (1984:298) observing that *Homo erectus* probably made the early Acheulian tools, but the association of the tools with these hominids is not clear in the southern African sites.

However, these cases do not make sites with better contexts disappear. Rightmire (1984:298, 300) mentions sites at which fossil hominids and tools are found in more solid contexts. Mania and Vlcek (1981:133-151) also report a hominid site with associated hominid fossils, faunal remains, and tools. The Koobi Fora (Kenya) site is undoubtedly a butcher site replete with concentrations of stone tools; the only creature that could have made tools in that region is an early hominid species (Leakey and Lewin 1978:12). (See Isaac [1984:7-10] and Jones, et al. [1992] for further evidence.) And most would disagree with the authors about Zhoukoutien; tool-using *Homo erectus* is most likely represented at that site near Beijing (Harrold 1990:6).

Archaeologists would love to find an Australopithecine or *Homo habilis* who choked to death on a classifiable bone of an extinct animal, with an Oldowan utensil in hand, covered over by a layer of hardened, datable volcanic ash preserving the footprints of disappointed family and friends leaving the body. This hasn't happened. Yet, finds of tools in context with butcher sites or living sites, with hominid remains existing in the general region (near tools, in a few cases), are too strong to disavow in the absence of any other fossil of an intelligent creature that could produce tools and living floors. This evidence cannot be compared with eolithic evidence found out of context in the 19th century.

Acceptance of Poor Evidence

Any supporting evidence seems acceptable to the authors. I wish the Triassic "shoe sole" (p. 807) (also cited by many "scientific" creationists) were held to some standard of documentation, with its blurry photograph and no sign of the stitching, etc., proving it to be a shoe fossil. The authors criticize

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the quality of Java Man and Zhoukoutien Cave finds even though the techniques and documentation of these finds cannot be compared to the unconvincing claims of other reports, such as those stemming from sworn testimonials, as can be found on page 376 ff., and they ignore the well-documented on-going discoveries at the Beijing site. Similarly, when the book documents a claim for a modern-type human skeleton (reported in an 1862 geology journal) in a coal deposit 90 feet deep, we learn the authors wrote the Geological Survey to date the coal to about 286 million years (p. 454). But we are not treated to a contextual discussion of the bones—how they were found, who found them, what was the site like, and how these allegedly old bones came out of the earth with only a loose black coating that was easily scraped away to reveal nice white bone, etc. The impression left is that, if a tabloid reported Jimmy Hoffa's corpse was found in Triassic deposits, then the authors would no doubt perform rigorous research to date those deposits and then include the data in their next book.

The best example of reliance on poor evidence is an attempt to make negative evidence into support. The introduction to the wildman chapter tries to use lack of evidence for wildmen to support the existence of them. The argument begins by questioning how—for example—we can really trust that Johanson's Ethiopian hominid finds were discovered as reported in the literature; also, how do we know that those same fossils are actually in the museum now? (p. 592). This line of argument leads into the plea that, if (for example) scientists believe Johanson's words, his reports, and assurances that the actual fossils are in the museum, then scientists ought to believe in reports of ape-people, since these scientific data are no more trustworthy than reports of ape-people. Said simply: "If you trust evidence from professionals, which we believe to be doubtful, then please trust our doubtful evidence."

Too often, accepted evidence (and mainstream theory) is called into question by claiming that scientists are dishonest. The idea is a venerable two-edged weapon, because if you accept this view of science and of dishonorable or clumsy scholars, then how can this book be trusted, either? If the evidence of Johanson's (or others') excavations can be so easily lost, switched, lied about, then how much more could the 19th century evidence be warped, the evidence on which this book relies so heavily? And how can we trust the authors, who attempt to use this evidently untrustworthy science-stuff?

Faulty View of the Scientific Process

One of the most striking themes of *Forbidden Archaeology* is the notion that scientists are slaves to tradition, which slows down or stops the adoption of new ideas. Yet, scientists have often turned over paradigms in the face of a social tradition or peer pressure that penalized them for it. Galileo pushed

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

his "wild" views of a heliocentric solar system until threatened by state-officiated torture. Modern cosmology is another example, a branch of knowledge under such motion and revision that I suspect astronomers are giants among coffee drinkers. Similarly, paleoarchaeology is revised often in the face of new evidence (see Tuttle 1988 for a feel for the controversy). The "knowledge filter" would have to be impossibly acrobatic to span all this change.

Forbidden Archaeology says that 19th-century scientists are to be trusted, however: they were open-minded about the nature of the artifacts they found in early strata, while today's scientists automatically explain away such finds (p. 90). (The authors don't notice the hard-hitting critics of eolith claims in the 19th and early 20th century [cf. Warren 1905])! The authors feel that the discovery of Java Man (one of the earliest pieces of direct evidence for human evolution) was a turning point that made scientists so narrow-minded. After the Java find, scientists became predisposed to the theory of evolution. I am not sure how this process works. If scientists ignore truth to be predisposed to tradition, then this paradigm would have favored the idea of the extreme age of modern human types because it is more easily worked into Biblical tradition than is evolution. (Perhaps this is why the Cardiff Giant hoax [see Feder 1990] worked out so well on the public—they were predisposed to believe in a fossil "giant" because they were imbued in a Biblical tradition of antediluvian giants.) How could Java man change such a tradition by itself unless scientists eventually become disposed to consider new evidence? Dubois would have been given cement overshoes, otherwise! Scientists were indeed open-minded—eventually the theory of evolution was adopted despite all the penalties of challenging an entrenched social tradition of Biblical history.

A more specific complaint centers on the exploitation of uncertainty in science. Some people may perceive (perhaps envy) that scientists feel confident delivering "truth"—what else, from the people who enabled moon landings and Tylenol? Of course, abundant mysteries exist to continually remind scientists of their limitations. However, an anti-science approach tries to turn this natural uncertainty into proof that mainstream science cannot be expected to get it right. For instance, *Forbidden Archaeology* opens its case in the introduction by citing that anthropologist Russell Tuttle saw a mystery in the fact that australopithecines existed around the same time as the human-like footprints at Laetoli. The citation ends there, and we don't know exactly what the mystery is that Tuttle sees (is it a mystery about two distinct species of hominid living simultaneously or how the curved big-toe of an ape-like creature could have left a modern-seeming footprint?). Let us be happy that Tuttle was mystified—this is proof that the curious and honest scientist in him is alive and kicking; but the authors have made a mystery in science into a crack in scientific process. Mysteries are everywhere, and when they disappear, so does

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

science, because science is only a method for understanding mysteries as reliably as possible.

It's Antievolutionism, but Is It Creationism?

I think so, as my title suggests. The authors state that they are followers of Vedic philosophy and aim to explain the history of the human race according to information preserved in Vedic texts and religion. They inform the reader that their religious affiliation should not matter if their ideas are solid (p. xxxvi), and I agree. Any person's work should be regarded on its merits. Religion and other cultural beliefs can bias an outlook, however, as the authors themselves would agree.

With this in mind, we can fairly ask if the authors are trying to force data into a mold shaped by Vedic religion. In his forthcoming review in *Geoarchaeology*, Feder mentions that the authors admit their religious affiliations but do not state their theoretical outlook. He writes, "Like fundamentalist Christian creationists, they avoid talking about the religious content of their perspective, so we can only guess at it." Feder tells us of the concept of the Vedic world cycle (manvantara) of 300,000,000 years in which the world with its humans is created and then destroyed in cycles. I think this concept is in keeping with *Forbidden Archaeology*'s thesis of modern-type humans existing throughout Earth history. Feder says, "We all know what happens when we mix a literal interpretation of the Judeo-Christian myth with human paleontology; we get scientific creationism. It seems that we now know what happens when we mix a literal interpretation of the Hindu myth of creation with human paleontology; we get the anti-evolutionary Krishna creationism of *Forbidden Archaeology*, where human beings do not evolve and where the fossil evidence for anatomically modern humans dates as far back as the beginning of the current manvantara." Actually, they push their artifactual evidence back 600,000,000-plus years to the Precambrian, where allegedly a grooved metallic sphere was found in South Africa and a metal vase in Massachusetts (p. 815).

I add that the Sanskrit epic, *Ramayana*, includes intelligent monkeys and bears who side with the Vedic gods against the demons. Has this narrative motif predisposed the authors to believe in modern-type humans living alongside intelligent animals (i.e., other hominids)? I can raise the hypothesis but know of no method for supporting it beyond the purely circumstantial evidence of the authors' stated religious affiliations, their broad theory of human existence alongside other hominids, and their belief in living apemen.

Conclusion

The authors posit a vast "knowledge filter" and often indict the honesty and biases of scientists. A fairer judgment is that scientists are human and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

have human potentials for failings; in my mind, this means that knowledge is accumulated at a slower rate than in a perfect world, but accumulate it does. At the most cynical point, I could posit that untruthful biases are uncovered because scientists eventually criticize loose thinking if only to further their careers. At their best, scientists—indeed, all scholars and artists—love truth and are driven to know how the world is made. Multiply these drives by the number of scholars living, and it all adds up to a normally self-corrective tradition (cf. Sagan 1979:82) that Cremo and Thompson reject with little basis.

Scientists have developed a rhetoric to report and, perhaps, to think about their studies as objectively as possible; however, this rhetoric can be used to further personal agendas even when the science is solid (see for example Halloran 1984:79)—the human and the scientist are inseparable. But instead of using *Forbidden Archaeology*, with its poorly supported claims, people interested in the problems associated with scientific reporting would do well to begin with professional work on the subject (for example, Coletta 1992; Fahnestock 1986; Gross 1990; Halloran 1984; Prelli 1989; Weimer 1977). Discussions of the history and nature of pseudoscience are available in Cole (1980), Feder (1990), Harrold and Eve (1987), and Williams (1991). Many of their characterizations will be recognized in *Forbidden Archaeology*.

To close this discussion, I suggest that Cremo and Thompson have succumbed to a logical fallacy that can plague both professional and amateur or marginal archaeologists. Dincauze (1984:292) writes about the trap of possibilist arguments.

> The possibilist fallacy "consists in an attempt to demonstrate that a factual statement is true or false by establishing the possibility of its truth or falsity" (Fischer 1970:53). . . . The danger comes when possibilities are confused with demonstration, when "it could be" is followed by an unearned "therefore, it is." One cannot falsify possibilities, and most skeptics wisely eschew the effort. From the skeptics' refusal to engage, proponents charge either tacit agreement or refusal to face evidence. . . . . The only appropriate engaged response to a possibilist argument is a request for evidence, rather than assertion.

Dincauze reminds us that investigation must begin with possibilist ideals, with the following caution: "Possibilist arguments are only the first step toward knowledge; they indicate a problem domain where the method of multiple hypotheses might be applied" (1984:310). Possibilist ideals inherent in part of the scientific approach are, perhaps, one reason why some people seem to be excited about *Forbidden Archaeology*.

The publisher included a notice of "advanced praise" along with the review copy. Some selections: Dr. Virginia Steen-Macintyre, a geologist, writes, "What an eye opener! I didn't realize how many sites and how much

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

data are out there that don't fit modern concepts of human evolution... [publisher's ellipsis] I predict the book will become an underground classic." *Fortean Times* said, "Cremo and Thompson have launched a startling attack on our whole picture of human origins and the way we have arrived at that picture: not only is the evidence impugned, but also the scientific method of handling it." Dr. Mikael Rothstein of the *Politiken Newspaper*, Denmark, remarks, "*Hidden History* (*sic*) is a detective novel as much as a scholarly *tour de force*. But the murderer is not the butler. Neither is the victim a rich old man with many heirs. The victim is Man himself, and the role of the assassin is played by numerous scientists." On the other hand, Richard Leakey replied to their request for a book blurb: "Your book is pure humbug and does not deserve to be taken seriously by anyone but a fool." In parentheses the publisher adds: "Representative of the scientific establishment's viewpoint."

This book, like other creationist texts that use similar techniques, is most useful as ethnographic data in studies of comparative religion, cult movements, popular movements, anti-science, fantastic archaeology, rhetoric, folklore—the book can be studied in any of these fields. With its emphasis on "secrets" and "hidden history" and "cover-up," the book participates in the popular genre of the conspiracy, akin to popular beliefs about the Kennedy assassination and crashed alien spaceships kept in guarded Air Force hangars. Sometimes the motifs of these modern legends are mixed with traditional motifs, as in the example of UFOs combined with traditional Irish fairy lore (Smith 1980:402), and a "scientific" explanation of why mermaids do not appear in Lake Michigan (Degh and Vazsonyi 1976:109, 112-113). These instances mark the relatively recent transition from agrarian to technological society, showing a need to react against mainstream science—or at least to dilute it—by adopting, re-inventing, or continuing traditional beliefs in the supernatural. The need for people to fantasize about such things is genuine; the behavior forms an aspect of Western, industrialized culture (perhaps an aspect diagnostic of our particular pressures) well worth interdisciplinary study.

This folklore connection is suggested in the book's constant looking-backward toward a "golden age" of open-minded scholars, which reminds me of the function of myth, in which the past is formed in a mythological story tradition to legitimize the present. I am also reminded of the romance genre of literature: "Romance is the mythos of literature concerned primarily with an idealized world in which subtlety and complexity of characterization are not much favored and narrative interest tends to center on a search for some kind of golden age" (after Lee 1972:227). Much of *Forbidden Archaeology* does read like a romance.

In any event, I have no evidence that people were or were not much more open-minded or golden a hundred years ago; but in the present I see *Forbidden Archaeology* fantasizing about a past open-mindedness to legiti-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

mize a vast restructuring of our present understanding—without good evidence.

Forbidden Archeology: The Hidden History of the Human Race, by Michael A. Cremo and Richard L. Thompson. San Diego: Govardhan Hill, Inc. 1994. xxxvii + 914 pp, with bibliography and index. Published by the Bhaktivedanta Institute, International Society for Krishna Consciousness. ($49.95, hb)

References

Cole, John R. 1980. Cult Archaeology and Unscientific Method and Theory. *Advances in Archaeological Method and Theory* 3:1-23.

———, and Laurie R. Godfrey. 1977. On "Some Paleolithic Tools from Northeast North America." *Current Anthropology* 18(3):541-543.

———, Robert E. Funk, Laurie R. Godfrey, and William Starna. 1978. On Criticisms of 'Some Paleolithic Tools from Northeast North America": Rejoinder. *Current Anthropology* 19(3):665-669.

Coletta, W. John. 1992. The Ideologically Biased Use of Language in Scientific and Technical Writing. *Technical Communication Quarterly* 1(1):59-70, Winter.

Day, Michael H. 1986. *Guide to Fossil Man.* 4th edition. University of Chicago Press.

Degh, Linda, and Andrew Vazsonyi. 1976. Legend and Belief. *Folklore Genres.* Dan Ben-Amos, ed. Austin: University of Texas Press, pp. 93-123.

Dincauze, Dena F. 1984. An Archaeo-Logical Evaluation of the Case for Pre-Clovis Occupations. *Advances in World Archaeology* 3:275-323. F. Wendorf and A.E. Close, eds. London: Academic Press.

Donaldson, E. Talbot, trans. 1967. Beowulf. *The Norton Anthology of English Literature*, Vol. 1. 3rd ed. New York: W.W. Norton & Co.

Fahnestock, Jeanne. 1986. Accommodating Science: The Rhetorical Life of Scientific Facts. *Written Communication* 3:275-296.

Feder, Kenneth L. 1990. *Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology.* Mountainview, CA: Mayfield.

———. 1994. Forthcoming Book Review for *Geoarchaeology.*

Fischer, D.H. 1970. *Historians' Fallacies.* NY: Harper and Row.

Funk, Robert. 1977. On "Some Paleolithic Tools from Northeast North America." *Current Anthropology* 18(3):543-545.

Gross, Alan G. 1990. *The Rhetoric of Science.* Cambridge: Harvard University Press.

Halloran, S. Michael. 1984. The Birth of Molecular Biology: An Essay in the Rhetorical Criticism of Scientific Discourse. *Rhetoric Review* 3(1):70-83.

Harrold, Francis B. 1990. Past Imperfect: Scientific Creationism and Prehistoric Archaeology. *Creation/Evolution* 27: 1-11.

Harrold, F.B., and R.A. Eve, eds. 1987. *Cult Archaeology and Creationism: Understanding Pseudo-scientific Beliefs about the Past.* Iowa City: University of Iowa Press.

Isaac, Glynn. 1984. The Archaeology of Human Origins: Studies in the Lower Pleistocene in East Africa, 1971-1981. *Advances in World Archaeology* 3:1-87. F. Wendorf and A. E. Close, eds. London: Academic Press.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Jones, Steve, R. Martin, and David Pilbeam, eds. 1992. *The Cambridge Encyclopedia of Human Evolution*. Cambridge: Cambridge University Press.

Leakey, Richard E., and Roger Lewin. 1978. *People of the Lake: Mankind and Its Beginnings*. New York: Doubleday.

Lee, Alvin A. 1972. *The Guest-Hall of Eden*. New Haven: Yale University Press.

Mania, Dietrich, and Emmanuel Vlcek. 1981. *Homo erectus* in Middle Europe: The Discovery from Bilzingsleben. *Homo erectus: Papers in Honor of Davidson Black*. B. Sigmon and J. Cybulski, eds. Toronto: University of Toronto Press, pp. 133-152.

Prelli, L.J. 1989. *A Rhetoric of Science: Inventing Scientific Discourse*. Columbia: University of South Carolina Press.

Raemsch, Bruce. 1978. On Criticisms of "Some Paleolithic Tools from Northeast North America." *Current Anthropology* 19(1):157-160.

Rightmire, G.P. 1981. *Homo erectus* at Olduvai Gorge, Tanzania. *Homo erectus: Papers in Honor of Davidson Black*. B. Sigmon and J. Cybulski, eds. Toronto: University of Toronto Press, pp. 189-192.

Sagan, Carl. 1979. *Broca's Brain: Reflections on the Romance of Science*. New York: Random House.

Smith, Linda-May. 1980. Aspects of Contemporary Ulster Fairy Tradition. *Folklore Studies in the Twentieth Century. Proceedings of the Centenary Conference of the Folklore Society*. Venetia J. Newall, ed. Rowman and Littlefield: D.S. Brewer, pp. 398-404.

Starna, William A. 1977. On "Some Paleolithic Tools from Northeast North America." *Current Anthropology* 18(3):545-546.

Tuttle, R.H. 1988. What's New in African Paleoanthropology? *Annual Review of Anthropology* 17:391-426.

Walker, Alan. 1981. The Koobi Fora Hominids and Their Bearing on the Genus *Homo*. *Homo erectus: Papers in Honor of Davidson Black*. B. Sigmon and J. Cybulski, eds. Toronto: University of Toronto Press, pp. 193-216.

Warren, S.H. 1905. On the Origin of "Eolithic" Flints by Natural Causes, Especially the Foundering of Drifts. *Journal of the Royal Anthropological Institute* 35:337-364.

Weimar, Walter B. 1977. Science as a Rhetorical Transaction: Toward a Nonjustificational Conception of Rhetoric. *Philosophy and Rhetoric* 10:1-19.

Williams, Stephen. 1991. *Fantastic Archaeology: The Wild Side of North American Prehistory*. Philadelphia: University of Pennsylvania Press. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

What Inerrists Believe

Mark Isaak

The secular scientists say it's apparent
That mankind evolved up from goo,
But since we all know that the Bible's inerrant,
It's obvious this can't be true.
The scholars will tell you until you grow weary
The evidence things all evolved,
But ultimately this is only a theory;
They don't have the issue resolved.
The paleontologist experts have stated
There's fossils they still cannot find,
And though some new species have been generated,
We've never yet seen a new "kind."
The chemicals making you all fit together
In very well ordered array;
It's very instructive to ask yourself whether
Pure chance could have made you that way,
Especially since most mutations exhibit
A trend to destroy and degrade,
And laws about thermodynamics prohibit
That anything new can be made.
Disciples of Darwin should be much embarrassed
For touting ideas so naive.
For I am an Orthodox Bible Inerrist,
And that's what Inerrists believe.

The discourse of science is filled with correction
And wrangling and change and debate.
Creation, however, is timeless perfection—
A theory which none can negate.
Geologists, using Potassium-Argon,
Date granite four billion years old;
Since laymen, however, can't follow their jargon,
We can't say their findings will hold.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

For Genesis says that the Earth's rather youthful
And once by a flood was immersed;
If Genesis says it, we know that it's truthful;
The Biblical facts must come first.
At this, evolutionists like to assail ya
With questions they think you don't know,
Like, "How did the kangaroos get to Australia?"
And, "Where did the water all go?"
Divine intervention provides explanation.
Yes, all things are easy to Him.
God might have assembled the whole of creation
Last Thursday, if that was His whim.
To charge God with impotence is the unfairest
Of charges which I can conceive.
For I am an Orthodox Bible Inerrist,
And that's what Inerrists believe.

The proof of inerrancy has a foundation
More basic than tables and charts.
It has irrefutable verification—
The faith which we have in our hearts.
The Bible has governed my life, so I know it
Is trustworthy all the way through.
It works for my spirituality, so it
Must be universally true.
But then so-called experts ignore what I witness;
It rivals their kind of research.
By this, they implicitly charge with unfitness
Myself and my friends and my church.
These scientists make accusations befitting
A goal of dissension and strife;
To grant evolution is same as admitting
That Satan's controlling your life.
Can we abide this atheistic invention
Equating a monkey with Man?
Our duty enjoins us to show our dissension
And thwart it wherever we can.
In textbooks and classrooms, our foes should be harassed
Until we can get them to leave.
For I am an Orthodox Bible Inerrist,
And that's what Inerrists believe.

I'm criticized often for not really knowing
Much science, which I will concede—

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

But only in subjects which merit foregoing;
I have all the facts that I need.
I've listened to Morris and Gish as they lecture;
I watch Reverend Pat on TV.
Since they've pointed out life's divine architecture,
It sure looks created to me.
A PhD isn't sufficient credential
For minds which are closed to the light.
An oath that the Bible can't err is essential
To prove you accept what is right.
We must above all fight heretical preaching
Which sanctions a doctrine so loose.
Who treats revelation as fable is teaching
A practice of Bible misuse.
It's hubris to think that, by studying science,
God's mysteries all can be known.
One finds revelation through total compliance
To Orthodox clergy alone.
Such faithfulness, our leaders say, is the rarest
Fulfillment a man can achieve,
And I am an Orthodox Bible Inerrist,
And that's what Inerrists believe. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

A Survey on University Students' Understanding of the Place of Evolutionary Biology in the Creation/ Evolution Controversy

Ronald K. Hodgson and Shu-ping C. Hodgson

Public opinion plays an important role in the creation/evolution debate, especially in regard to equal educational time for teaching creationism as a science subject in public schools. A number of studies have shown that the public is reluctant to accept evolutionary theory and is confused about it (Bergman 1979; Christensen and Cannon 1978; Cole 1988; Fuerst 1984; Harrold and Eve 1987; Stewart 1992; Zimmerman 1986, 1987, 1990, 1991). This is extraordinary when one considers that such reluctance is at odds with the scientific establishment, in general, and professional evolutionary biologists, in particular. After a review of an array of public opinion surveys on requiring the teaching of "creation science" in public schools, Fuerst (1984) suggested that a communication gap exists between professional evolutionary biologists and the public regarding the organic basis of life.

Fuerst's 1984 study and a study by Zimmerman (1986) using the same questionnaire suggest that the communication gap also exists between professionals and college and university students, including in some cases undergraduate and graduate biology majors. Fuerst, at The Ohio State University (OSU), found 80% of students favored introduction of "creation science" into the classroom. Zimmerman at Oberlin College reported that 56.3% favored "equal time for creationism" in schools.

What is this communication gap? Is the gap merely confusion over the basic tenets of evolutionary biology or is it a more profound gap, i.e., a gap

Ronald K. Hodgson is Assistant Professor of Biology and **Shu-ping C. Hodgson** is Associate Professor of Mathematics at Central Michigan University, Mount Pleasant, Michigan.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

based more on confusion over what science is and how it operates? It is our hope to at least partially answer this question.

Our study is an opinion survey of a group of university undergraduates, using Fuerst's 1984 questionnaire. Our results corroborate his findings at OSU to an amazing degree. Our study differs from his study and Zimmerman's 1986 study, however, by also examining the question of whether exposure to evolutionary theory in the college classroom influences student opinion concerning the creation/evolution controversy or whether student opinion is preconceived before enrollment, with little subsequent alteration in opinion.

Our study also examines student opinion after exposure to course work in historical geology in addition to biology. Our contention is that a historical geology course often systematically builds a case for evolution (even if only a partial case) in contradistinction to the often dogmatic presentation of evolutionary theory in many introductory biology classes.

Materials and Methods

We polled students using Fuerst's nine question survey (Table 1). Four of the questions were on the balanced treatment of "creation science" and evolution, and the other five concerned opinions on the scientific validity of evolution.

We administered the survey in 10 courses at Central Michigan University (CMU), a Midwestern university with 16,000 students from all of Michigan's counties. Answer sheets were anonymous and participation was voluntary. We surveyed 818 students within the first two weeks of a 15 week semester and an additional 554 within the last two weeks for a total of 1,372 responses. The courses included introductory biology classes for non-science students (n=580), introductory biology classes for biology majors and minors (n=87), a genetics course taken by biology majors (n=90), introductory geology classes for non-science students (n=131), and three political science and sociology classes taken by students to fulfill general education requirements for graduation (n=484).

As in Fuerst (1984), the relative ranking of students by their biological background allows us to see whether an individual's opinions concerning the creation/evolution issues are correlated with their interest in the biological sciences. It should also be possible to look at correlations of opinions regarding the creation/evolution issues and students' interest in geology. In addition, a comparison of the opinions of students at the beginning of a course and of those at the end of a course provide insight with regard to the effects of college-level biology and geology classes on opinions concerning creation/evolution issues and knowledge of evolutionary theory.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

We used the Chi-square analysis to examine differences between groups of students, between the beginning and ending of a course, and relationships between responses to various questions.

Results

When we compared the data collected at the beginning of a course against those collected at the end, we found only a few cases with significant differences. Therefore, unless otherwise indicated, the results reported in this section, as well as those presented in Table 1, represent the proportions obtained from the combined sample of students surveyed in the beginning and at the end of the semester.

Question #1 asked students if they believed in Darwin's theory of evolution. Sixty-seven percent of the students answered affirmatively, which is similar to Fuerst's finding of 62% at OSU. The students in different cources responded significantly differently to the question, with higher percentages of students answering "yes" in the more sophisticated biology (genetics, and introductory biology for majors and minors), and geology courses. The increase in affirmative answers among these students can be attributed to (1) the course content and/or (2) the course selection bias of students interested in science. There were no statistically significant differences within groups at the beginning versus the end of the course, except for the surprising and inexplicable decrease in the genetics course: 81% in the beginning and 62% at the end.

Students were then asked whether both evolutionary theory and other views such as the divine origin of life through special creation should be taught in public schools (Question #2). Eighty-one percent (OSU 80%) favored equal time treatment. We find no significant difference between groups of students. However, in agreement with the OSU findings, there is a significant difference in response depending on a student's response to Question #1. Eighty-nine percent (OSU 91%) of students who claimed not to believe in evolution preferred that both theories be taught compared with 77% (OSU 74%) of those who claimed to believe in evolution. All these percentages favoring equal time treatment are remarkably high. We found no differences within courses from the beginning to the end of the semester except for the genetics course: 86% in the beginning and 65% at the end.

Question #3 investigated a respondent's feelings concerning creationism as religion in the public schools. Sixty percent (OSU 58%) of students did not agree that giving creationism equal time would be permitting religion into public schools. There were no significant differences between courses, and we did not find a single course in which a majority agreed that teaching creationism would be allowing religion into the schools. If students claimed to believe in evolution, however, they were significantly more likely to feel that creationism would be religion in the public schools than those claiming

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

not to believe in evolution, 43% versus 32%. Although there were no courses with a majority of students in the beginning of the semester agreeing that teaching creationism would be allowing religion into public schools, a majority did express such opinions at the end of the semester in the geology courses (53%) and the genetics course (53%).

Question #4 dealt with the various methods to implement teaching of creationism. Sixty percent felt that textbooks or school curricula should be changed to present both theories (OSU 62%). There were no significant differences between groups or between the beginning and the end of the semester. Significantly fewer (56%) of those claiming to believe in evolution favor changing textbooks or curricula than those claiming not to believe in evolution (70%).

Question #5 asked students if they were taught evolution in high school. Seventy-three percent (OSU 73%) said "yes." Of those who claimed to believe in the theory of evolution, significantly more (75%) said evolution was taught to them in high school than those who claimed not to believe in evolution (70%). As expected, no significant differences were found between groups or between the beginning and the end of the semester.

The students were next asked, in Question #6, to choose a statement which best described their understanding of the modern theory of evolution. The five choices can be ranked by their agreement with modern evolutionary teachings. The best answer is B (different offspring production), with both A (survival of fittest) and E (strong eliminating weak) also being partially in agreement with evolutionary theory, while neither C (man evolving from gorilla) nor D (purposeful striving) agrees with evolutionary theory. Only 7% of all students (OSU 8%) chose B as their answer. Although a significant difference was found in the responses to this question between the courses, exposure to biology or geology courses does not seem to affect their ability to identify B as the best statement. Only 46% percent chose either A, B, or E but increased exposure to biology does seem to increase this percentage. For example, 56% of genetics students chose A, B, or E while only 36% of students with no university biology or geology did so. A comparison between the responses among genetics students given in the beginning and the end of the semester is significant. No students chose B at the beginning of the semester, while 10% did so at the end. Also, only 48% chose A, B, or E in the beginning, while 67% did so at the end. When the data were analyzed against the responses to Question #1, no significant differences were found between the responses of students who claimed to believe in the theory of evolution and those who did not.

In Question #7, students were asked if evolutionary theory had a valid scientific foundation. Of the entire student group, 61% felt that it had a valid scientific foundation (OSU 59%), with over 60% of them (37% of the total) feeling that it was both valid and testable. Of the students who felt that evolutionary theory does not have a valid scientific foundation, about 40%

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

(16% of the total) said this was because the theory was principally based on speculation. There were no significant differences between the opinions of those tested in the beginning and at the end of each course. However, the responses to this question differed significantly between courses; 70% of the genetics and geology students said that evolutionary theory had a valid scientific foundation while only 57% of the other students said so. A striking relationship is also found between students' opinions on the validity of the theory of evolution and on their responses to Question #1. Of those who claimed to believe in the theory of evolution, 78% said it had a valid scientific foundation, while only 25% of those who claimed not to believe in evolution said so.

Question #8 is another one dealing with the scientific foundation of evolutionary theory. It asked students if they felt that most scientists believe the theory of evolution is not a valid scientific theory. Overall, 21% agreed with the statement. The percentage varied significantly between different courses. For example, the students with no university biology or geology and those taking introductory biology for nonscience majors had 25% and 26%, respectively, while the geology and genetics students had only 18% and 12%, respectively. The responses of those questioned in the beginning did not differ significantly from those tested at the end of the course. As in the case of Question #7, the results of Question #8 are significantly related to those of Question #1. Of those believing in the theory of evolution, 19% said that scientists believed that evolution is not a valid scientific theory, while 27% of those who claimed not to believe in the theory of evolution said so.

The last question (Question #9) asked the students if they thought the teaching of naturalistic concepts, such as those used in the modern theory of evolution, might lead to a "decay" of American society. Twenty-four percent (OSU 22%) of all respondents said "yes." The proportion of affirmative responses were not significantly different between courses or between the beginning and the end of the course. There is again, however, a significant relationship between the responses to Question #9 and Question #1. Forty-two percent of those who did not claim to believe in evolution thought teaching of such concepts might lead to a "decay" of American society, which is significantly different from the 15% of those who claimed to believe in the theory of evolution.

Finally, we obtained similar results to the OSU study when we analyzed Questions #7 and #8 together. Forty-three percent (OSU 36%) of students who answered that scientists consider evolutionary theory invalid, personally felt that evolutionary theory had a valid scientific foundation. Only 66% (OSU 67%) of those who believe that scientists consider evolution to be a valid science accept that evolution has a valid scientific basis themselves.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Discussion

Our study, as does Fuerst's 1984 study at The Ohio State University, suggests that scientists are not teaching evolutionary theory or the nature of the scientific process effectively to students. About one-third of university students do not accept Darwinian evolution, and of those that do accept evolutionary theory, 77% feel that in fairness, "creation science" should also be equally presented.

Fuerst's survey suggested "that increased interest in science, and the accompanying increase in education in the biological sciences does lead to greater acceptance of evolution as a scientifically valid discipline." Our results support Fuerst's findings. It is disheartening, however, that up to 25% of students in some science classes apparently continue to misunderstand the nature of scientific inquiry.

Zimmerman's study at Oberlin College (1986), a rather "liberal" liberal arts college, differed only quantitatively, not qualitatively, from Fuerst's and our own study. He found that a significantly higher percentage of Oberlin students than OSU students accept evolutionary theory, recognize that teaching creationism would be allowing religion into public schools, claim that they have been taught evolution in high school, and accept that scientists consider evolutionary theory to be valid. His study also indicated that "the amount of biology education experienced by students is associated with an increasingly negative attitude towards creationism." What could not be ascertained from either study is whether students continuing on in biology are more favorably disposed toward evolution or if their views are actually changed by course work. We addressed this question by examining students' opinions at the beginning and the end of each course surveyed. As reported, we found no differences in most cases between the beginning and the end of the semester groups for any question for any course. We conclude that students continuing in biology at the university level are favorably predisposed toward evolution rather than that their views are substantially altered by course work. Regrettably, in either case, only a small percentage of even students continuing in biology possess an accurate knowledge of evolutionary theory, as indicated by their responses to Question #6. In short, evolution is accepted by many students but not actually understood by them.

The creation/evolution controversy is most often associated with the teaching of biology at the high school level. We suspect, however, that the evidence for evolution is seldom systematically or critically presented in a general biology course taught at any level. We suggest that geology courses (even when taught to nonscience students as in our survey) probably present a more systematically evidential case for evolution than do most biology classes and therefore that we should find students taking such classes to be more supportive of evolutionary theory, either because of their course work or a predisposition to favor evolution. Although our study may suggest that

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

such students do tend to favor evolution more strongly than do biology students, we found no significant differences between students surveyed at the beginning and end of the semester. This suggests that, as in the case of students continuing in biology, such students are predisposed to favor evolution rather than developing their favoritism from course work.

It is certainly interesting that such a major fundamental viewpoint of life accepted by the scientific community for a century and a half finds such low levels of understanding and acceptance among university students. It is hoped that the increasing interest in the development of critical thinking skills will aid scientists in better communicating their views to their students.

TABLE 1

The following questionnaire was given to students in political science and sociology courses. The first nine questions were given to students in biology and geology courses. For Questions 1 to 9, the numbers in parentheses are the percentages of respondents who chose the items from the entire sample (n=1372). For Questions 10 and 11, the percentages are from the 484 students in political science and sociology courses.

1. Do you believe in Darwin's theory of evolution?
   A. Yes (67%)
   B. No (33%)
2. If Darwin's theory of evolution is taught in public schools, should other views (including the divine origin of life through special creation) be taught too?
   A. Yes (81%)
   B. No (19%)
3. Do you think that scientists are right in their argument that by giving creationism equal time they are allowing religion into the public schools?
   A. Yes (40%)
   B. No (60%)
4. If you think Darwinism and creationism are both valid theories, what is the best way to teach them?
   A. Require all students to take courses in biology and religion (11%)
   B. Teach creationism at home (10%)
   C. Change textbooks or school curricula to present both theories (60%)
   D. Other (19%)
5. Were you taught about evolution in your high school biology course?
   A. Yes (73%)
   B. No (27%)

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

6. Which of the following best agrees with your impression of the Modern Theory of Evolution?
   A. The phrase "Survival of the Fittest" (32%)
   B. Evolution occurred because different individuals left different numbers of offspring (7%)
   C. Man evolved from either the gorilla or chimpanzee in Africa (11%)
   D. Evolution involved a purposeful striving towards "higher" forms, (that is a steady progress from microbes to man) (43%)
   E. Evolution occurred because the strong eventually eliminated the weak (7%)
7. Do you think that the modern theory of evolution has a valid scientific foundation?
   A. Yes, because it is possible to test many "predictions" of evolutionary science (37%)
   B. Yes, even though we can never test "predictions" about events in the past (24%)
   C. No, because we can never be sure about the past (10%)
   D. No, because evolutionary science is principally based on speculation, and not on "hard" scientific facts (16%)
   E. No (for other reasons) (14%)
8. Is it your impression that most scientists now believe that the modern theory of evolution is not a valid scientific theory?
   A. Yes (21%)
   B. No (79%)
9. Do you believe that the teaching of concepts which rely on a purely naturalistic explanation of the world, such as that used in the modern theory of evolution, might eventually lead to a "decay" of American society?
   A. Yes (24%)
   B. No (76%)
10. Have you or are you now taking a course in biology at the college/university level?
    A. Yes (59%)
    B. No (41%)
11. Have you or are you now taking a course in geology at the college/university level?
    A. Yes (18%)
    B. No (82%)

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Acknowledgments

The authors would like to thank the instructors and students at Central Michigan University for participating in the survey. We would also like to thank Robert Aron for his valuable suggestions regarding the manuscript.

References

Bergman, J. 1979. The Attitude of University Students Toward the Teaching of Creation and Evolution in the Schools. *Origins* 6:60-70.

Christensen, H.T and K.L. Cannon. 1978. The Fundamentalist Emphasis at Brigham Young University: 1935-1973. *Journal for the Scientific Study of Religion* 17:159-164.

Cole, J.R. 1988. Creationism and the New Right Agenda: An Opinion Survey. *Creation/Evolution* 8(1):6-12.

Fuerst, P.A. 1984. University Student Understanding of Evolutionary Biology's Place in the Creation/Evolution Controversy. *Ohio Journal of Science* 84:218-228.

Harrold, F.B. and R.A. Eve. 1987. Patterns of Creationist Belief Among College Students. In *Cult Archaeology and Creationism: Understanding Pseudoscientific Beliefs About the Past*, F.B. Harrold and R.A. Eve, editors. Iowa City:University of Iowa Press, pp. 68-90.

Stewart, B. 1992. Science or Animism? *Creation/Evolution* 12(1):18-19.

Zimmerman, M. 1986. The Evolution-Creation Controversy: Opinions from Students at a "Liberal" Liberal Arts College. *Ohio Journal of Science* 86:134-139.

———. 1987. The Evolution-Creation Controversy: Opinions of Ohio High School Biology Teachers. *Ohio Journal of Science* 87:115-125.

———. 1990. Newspaper Editors and the Creation-Evolution Controversy. *Skeptical Inquirer* 14:182-195.

———. 1991. A Survey of Pseudoscientific Sentiments of Elected Officials: A Comparison of Federal and State Legislators. *Creation/Evolution* 11(2):26-45. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Replies and Comments

Rejoinder to Bradbury

Matthew Landau and B.J. Landau
Stockton State College, Pomona, NJ

A few years ago we published a short paper in *C/E* on protein formation and probability (Landau and Landau 1991-1992). Recently, a reply to that paper has been published (Bradbury 1993) calling the work "deceptive" and a "misrepresentation." One of us (ML) was called a "member of a satanic evolutionary cult" a number of years ago in a letter to a Florida newspaper, so we consider Mr. Bradbury's comments relatively mild. Nonetheless, we appreciate the chance to speak to the issues he brought up.

Bradbury's chief objections, if we understand him, were that we developed a "strawman figure," a protein with 100 residues, which he feels is too small, and that we misquoted Duane Gish's (1972) monograph on the origin of life. We did not mean to imply that Gish used a 100 residue protein but merely cited his paper as an example of how the calculations are done, which is the reason we introduced the example with the phrase "*generally* the reasoning runs *something* like this." We used no quotation marks. As Bradbury correctly points out, Gish (p. 24) did not use the 100 residue protein; rather, he used one with 340 amino acids as an example. The 100 residues was chosen so we could make comparisons to the results of Lau and Dill (1990). But by the way, the 100 residue model *has* been used by other creationists (for example Stenger 1983). *The main thrust of our paper* (which is summarized below), *had little to do with the number of residues in the protein.* However, since the subject has been broached, let's talk about it.

When Gish talks about a "simple" protein with 340 residues in the same breath as the origins of life, others more cynical than we are might suggest *he* is using the "strawman figure." Clearly, the proteins that we see today, even those in the least complex microbes, are the products of billions of years' evolution. There is no reason to think that the large proteins of 1994 are anything like the protoproteins which might have once formed. This theme has been discussed in detail elsewhere (Goodman et al. 1979 is a good place to start). In fact, we feel 100 residues is a *generous* estimate of an early protein's size.

The point that we tried to make in our paper is that there is no single arrangement of amino acids in a typical protein that is absolutely the *only* possible operational sequence. For example, D-glucose-6-phosphate dehydrogenase may initialize the hexose monophosphate shunt in a variety of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

organisms, but based on the variabilities in their properties, it's highly unlikely that the exact same enzymes are in brine shrimp, bacteria, and vertebrates (Kamada and Hori 1970; Landau et al. 1980). We actually have no idea how many molecules, both larger and smaller than any particular sequence, might be able to catalyze this particular dehydrogenation reaction. In order to address the question of probability we have to have some idea about the size of the set of sequences that might be functional. Lau and Dill (1989, 1990) provided the scientific community with a physical model for protein folding that *begins* to answer this complex question.

Finally, the whole idea of using *post hoc* probabilities is very questionable (cf., Harker, 1994). The probability of the 1983 Mazda that we drive ending up with the exact license plate it has now is probably one in 200,000,000 (a *guess* at the number of functional cars on the world's roads). The chances of two people with our exact birthdays driving it (assuming anyone from 18 to 70 years old might be the owner), also having two children whose exact birthdays are the same as ours are is $[(1\ \ 200{,}000{,}000) \times (1\ \ (365 \times 53))^4] = 3.57 \times 10^{-26}$. This does *not* statistically prove we couldn't be driving the Mazda (it may prove something about the salaries of faculty at small state colleges). It means we have to be very careful when we apply probabilities to past events.

References

Bradbury, D.A. 1993. Reply to Landau and Landau. *Creation/Evolution* 13(2):48-49.

Gish, D.T. 1972. Speculations and Experiments Related to Theories on the Origin of Life: A Critique. San Diego: Institute for Creation Research.

Goodman, M., J.-F. Pechere, J. Haiech, and J.G. Demaille. 1979. Evolutionary Diversification of Structure and Function in the Family of Intracellular Calcium-binding Proteins. *Journal of Molecular Evolution* 13:331-352.

Harker, K. 1994. Odds Are That Too Few People Understand "Chance." *NCSE Reports* 13(4)/14(1): 14-15.

Kamada, T. and S.H. Hori. 1970. A Phylogenetic Study of Animal Glucose 6-Phosphate Dehydrogenases. *Japanese Journal of Genetics* 45:319-339.

Landau, M., C. Ivey, and J.P. Riehm. 1980. D-glucose-6-phosphate dehydrogenase from the Cysts of the Brine Shrimp, *Artemia salina* Leach. The Effects of Certain Ions and Coenzymes. *Comparative Biochem. Physiol.* 66B:147-150.

Landau, M. and B.J. Landau. 1991-1992. Random Protein Formation and the Origins of Life. *Creation/Evolution* 11(2):22-25.

Lau, K.F. and K.A. Dill. 1989. A Lattice Statistical Mechanics Model of the Conformational and Sequence Spaces of Proteins. *Macromolecules* 22:3986-3997.

———. 1990. Theory for Protein Mutability and Biogenesis. *Proceedings of the National Academy of Sciences, USA* 87:638-642.

Stenger, W. 1983. Is Physical Life the Result of Blind Chance? *The Plain Truth* 48(2):10-12, 38.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Amplification and Clarification from Karl Fezer

Karl Fezer
Department of Biology
Concord College, Athens, WV

Duane T. Gish, in a September 1, 1993 letter to me (KF), suggested that I "correct the statement that you made in your article" [Creationism: Please Don't Call It Science, *Creation/Evolution* 13(1): 45-49]. This is especially necessary because . . . you falsely accused me of being dishonest."

In that article (p. 47) I discussed Gish's claim that the "sudden" appearance of many different organisms in the Cambrian period supports creationism. I said, further, that

> to cast doubt on the fact that single-celled organisms existed on earth for vast aeons, Gish quotes some phrases from an A.E.J. Engel article expressing doubt about certain pre-Cambrian fossil claims. The fact that Engel's article begins by saying there are many undoubted pre-Cambrian fossils is ignored by Gish. This is plainly dishonest (Gish 1985:55; Engel *et al.* 1958).

Gish wants readers to know that, on page 55 of his 1985 book, he devotes a paragraph to sedimentary rocks that he says are "believed" to be Precambrian. Gish (p. 55) continues,

> There are now many reports in the scientific literature of the discovery in Precambrian rocks of fossils of microscopic, single-celled, soft-bodied creatures, such as bacteria and algae. On the basis of these claims, evolutionists are asserting that life arose on earth more than three billion years ago, perhaps as much as 3.5 billion years ago.
>
> It would be well to insert a cautionary note at this point concerning the nature of these reports. Certainly many are questionable and open to dispute. Some recent papers have suggested uncertainties of such identifications. [Gish cites four papers dated *1965 to 1968*, early in the study of Precambrian fossils.] For example, although they accepted the probability that certain alleged microfossils of Precambrian age were of biological origin, Engle [*sic*] *et al.* cautioned that "Establishing the presence of biological activity during the very early Precambrian clearly poses difficult problems . . . skepticism about this sort of evidence of early Precambrian life is appropriate" [cit. to Engel *et al.* 1968].

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Gish wrote me, "I did thus state precisely what you said I did not state . . . that not only Engel and his co-authors, but many others had reported discovery of microscopic fossils in Precambrian rocks."

My response: I did *not* accuse Gish of ignoring the fact that there have been many reports of Precambrian fossils. Indeed, what I said implied that Gish acknowledged the existence of such reports. I *did* say that he tried to make those reports appear doubtful, and that he did so by quoting phrases from Engel *et al.* in a way that suggested they shared in this general doubt. In doing this he ignored their opening sentence: "The search for evidence of early terrestrial life in the better preserved, old Precambrian sedimentary rocks has revealed a wide variety of unequivocal fossils . . . ." My dictionary defines "unequivocal" as "impossible to misunderstand or doubt." In the passage to which Gish objects I said "undoubted."

The bulk of the article by Engel *et al.* is about specific *other* fossils that are "probably of biological origin," but about which caution and skepticism are appropriate. The phrases from the Engel article quoted by Gish refer specifically to these, not to all Precambrian fossils.

Gish's letter to me also says, "If evolutionists [like Engel] feel compelled to add cautionary notes concerning some of these reports, then it would certainly be appropriate for me to do also." The answer to this sanctimonious statement is that Engel *et al.* were trying to put particular fossils in proper perspective. Gish, totally uninterested in particular fossils, tried to cast a pall over the entire subject. The reason is that several billion years with only single-celled organisms, before more complex ones appear, is embarrassing to creationism. If Gish were to admit the existence of "unequivocal" Precambrian fossils, what would it matter that some others, as one might expect, are "equivocal?" What would be the point of Gish's "cautionary note?"

In his letter Gish said, "I think that people like you should be extremely careful when you accuse fellow scientists of being deliberately dishonest." I agree. But my criticism of Gish was fully justified. (Note that "deliberately" is Gish's word, not mine. Self-deception is an alternate possibility.)

On May 3, 1994, I sent the above to Gish and invited him to respond both to it and to my accusations in another article (Fezer 1993b). He replied to me on May 24th,

> I think it was the overwhelming consensus that I had responded most adequately to your challenges, but you failed completely to respond adequately to the challenges that I gave you. . . . The article you published in *Creation/Evolution* is another attempt to cover up your defeat.

Gish ignored the subjects of my article: his false claims that *Basilosaurus* was a reptile and that Eugene Dubois kept his Wadjak (Java) discoveries secret for thirty years. As regards his quotes of Engel *et al.*, Gish said,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

> I do insist that you did misrepresent my writing. In the article which you cited, I illustrate beyond doubt that the authors had claimed that genuine Precambrian microfossils had been found. I went on to quote their cautious statements concerning such findings. But you accuse me of being dishonest in the way I had used their material. This is an outrageous charge and has no truth.

Gish's term "such findings" obviously refers to all claims of Precambrian microfossils. But the passage he quoted did *not* refer to "unequivocal" fossils. It seems impossible to get Gish to read anything carefully.

References

Engel, A.E.J., B. Nagy, L.A. Nagy, C.G. Engel, G.O.W. Kremp, and C.M. Drew. 1968. Alga-like Forms in Onverwacht Series, South Africa: Oldest Recognized Lifelike Forms on Earth. *Science* 161:1005-1008.

Fezer, Karl D. 1993a. Creationism: Please Don't Call It Science. *Creation/Evolution* 13(1):45-49, Issue 32.

———. 1993b. Creation's Incredible Witness: Duane T. Gish, Ph.D. *Creation/Evolution* 13(2):5-21, Issue 33.

Gish, Duane T. 1985. *Evolution: The Challenge of the Fossil Record.* El Cajon, CA: Creation-Life Publishers.

Editor's note: With Dr. Gish heard from, at least vicariously, this closes discussion on this topic in this forum. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Reviews

Christianity and the Nature of Science: A Philosophical Investigation.

by J.P. Moreland, 1989, Baker Book House, Grand Rapids, MI, 263 pp. $14.69 paperback.

Reviewed by Neil A. Wells, Department of Geology, Kent State University, Kent, Ohio

When this well-crafted book is used to push creationism into science classes, it will be hard to deal with. it is densely philosophical and very well organized (in terms of preemptively knocking out cornerstones of arguments that opponents need to use later), and it has a frustrating Through-The-Looking-Glass quality to its ground rules.

Moreland wants to show that science and religion can and should interact, and that religion need not be subservient. He claims that there is no definition of science and no single scientific method that can be used to demarcate science and non-science (Chapters 1 & 2). He proposes that there are fairly narrow limits to science (Chapter 3), and that science is not necessarily rational and does not necessarily secure truth (Chapter 4). He also says that religion has overlapped with science and should continue to do so, and that it should overrule science on occasion (Chapter 5). His take-home message is that science and scientific creationism are philosophically indistinguishable, so they merit equal standing (Chapter 6). Basically, he wishes to take science down a peg or two.

To wrest authority from science, he claims that defining science, setting its scope, and authorizing its methods are matters of philosophy (although science worries greatly about definitions and methodology and is inherently and appropriately self-referential). For example, he claims that science cannot ask what goes on in black holes because the question is too speculative, yet he views questions about "kinds" of animals (creationist "baramins") as legitimate, because "kinds" is no more biblical than, say, "trees" and is merely an as-yet incompletely defined scientific term.

Moreland denies that science guarantees truth or reliably improves its conclusions: theories are either true or false, and new ones replace old ones, so what justifies confidence now? I disagree. Successive theories increase in predictive and explanatory power (even misunderstanding can improve on no understanding). Meteorology isn't perfect, but religion has failed so long

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and so badly in predicting natural phenomena that missing a storm does not drive meteorologists back to goat guts and thunder gods. Science is an evolving, rational, exploratory worldview, so explanations should change as our understanding improves. Like explorers of an unmapped mountain range, scientists start along a likely-looking route, but their routes will change direction and slope as new goals appear and unforeseen obstacles arise. New viewpoints can dramatically augment or change one's perception of the landscape, but no matter what, understanding improves.

When Moreland claims that creationism and evolution merit equal treatment because they are philosophically equivalent (e.g., both make testable predictions), he does not say at what point the appalling failures of creationism's claims and predictions should disbar it from further consideration. In fact, he implies that creationism must in some sense be superior to science as an explanation because it includes the possibility of God as a causative factor, while science cannot, thus making creationism somehow broader and grander. In a related move, Moreland counters the charge that creation science is not scientific because it uses religious concepts by saying that "This objection fails because God is not necessarily a religious concept" (Moreland, p. 221). This is about the most bizarre claim I've ever read outside political campaign literature.

I could raise many similar objections, but they amount to demolishing a building by throwing bricks through the windows. Moreland's main argument seems solid, persuasive and untouched, and he uses variations of it again and again. The structure of his argument is:

1. Many scientists and philosophers consider that X (the scientific method, falsifiability, reproducibility, experimentation, or whatever) is a criterion or characteristic inherent to science;
2. Other, non-scientific, disciplines (such as history, philosophy, or theology) also adhere to this principal or use this method;
3. Science often falls short of this standard;
4. Therefore, science is once again not separate from non-science.

Each trip through this argument begins by positing "something is science if and only if it is X," which would be true if X were a sufficient and necessary criterion. The second and third points are usually supported with abundant examples and citations.

Moreland seems to work his way through every conceivable statement about science. Science is often described as understanding reality through experiment or observation, or explaining the material world using natural law. Moreland objects: science can be more about modelling reality than understanding it; science is not about the material world when it examines consciousness or culture; early science, done to understand the ways of God, was not guided by natural law. Similarly, some science is more speculation or calculation than observation and experimentation, and some is descriptive

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rather than explanatory. Science is often called testable, tentative, falsifiable, quantitative, repeatable, and/or predictive. Moreland objects: the nature of the empirical world is as much a matter of interpretation and inference as testing, and many scientists aim for "the truth" and are not tentative in their beliefs. Falsifiability supposedly fails because scientists often test broad hypotheses in parts or in groups and save their favorites by *ad hoc* adjustments. Some parts of science, such as theories in cultural anthropology and psychology, are not quantifiable, and historical sciences deal with unrepeatable events and are not predictive.

I disagree with how Moreland defines and attacks science, although I agree that science can overlap non-science, and that the search for a sole necessary and sufficient distinction is doomed to fail. Science is broad. It encompasses subdividing atoms, discovering irrational numbers, deciding what killed the dinosaurs, improving batteries, asking how the universe formed, predicting earthquakes, calibrating atomic clocks, identifying social patterns of religious beliefs, and finding the causes of cancer. Therefore, any definition must encompass many opposites: observation/speculation, description/explanation, deduction/inference, quantitative/qualitative work, "hands-on" theory-driven experiments versus "arm-chair philosophy" versus technological tinkering, material subjects versus immaterial subjects, exploring the unknown versus refining the known, etc. Moreland exploits this, by demanding that science be perfect, that all of it should always meet some specific criterion.

Failing to distinguish all science from all religion by sole criteria in no way equates them. Both are complex world-views, but theologies (and ideologies) are matters of belief, whereas sciences (and humanities) are matters of research (see how differently they treated the Shroud of Turin). According to Bunge (1984), belief claims to deal in truth, has premises that are essentially unmodifiable, and often concludes with the original understanding. Formal sciences (math and logic) deal with truth ascertained by logical deductions from hypothetical assumptions. Given a fixed set of starting conditions and rules, the conclusions are inevitable, albeit unknown at the outset. Empirical sciences (natural and physical sciences) deal with interpretations, as they start with an observation that is itself likely to be a bit interpretative, and can end with a new and unpredictable creative interpretation. Strahler (1987) distinguishes physical sciences as tending to be quantitative, deductive, reductionist, and predictive whereas natural sciences tend to be qualitative, inductive, holistic, and interpretative. Religion has little to do with any of this, and moreover is largely immune to evidence, deals with the unobservable and the unmeasurable, changes mostly by revelation, and manifestly fails to explain nature. Bunge (1984) provides a useful checklist of characteristics to distinguish science and pseudoscience (see Strahler 1987, and Schumm 1991).

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Science deserves a compound definition. For me, it is the rational exploration of the unknown. Its goals are modelling reality (making accurate predictions), mechanistic explanation (understanding via natural, efficient, material causes), and/or enhancement of scientific methods and tools. Its methods include observation, measurement, experimentation, posing and testing hypotheses, inference, deduction, calculation, and replication of results. (Note that paleontology interprets experiments, albeit complex ones run by nature from obscure starting conditions, and that hypotheses can be tested by predicting observations not yet known about earlier events.) Science is reiterative and progressive: any new data, ideas, explanations, or methods should lead to new generalizations and new questions, which should lead to even newer tests and observations, etc. Thus, knowledge changes with further research. Ideally, scientists are happy to hear new hypotheses, problems with old hypotheses, and criticisms of previous methods and conclusions, and they should continually question assumptions, search for counter-examples, and make and test predictions. They should second-guess their conclusions, which should be presented not as "the truth," but as the fullest and most satisfactory description or explanation available at the moment for the world as we know it. Individual scientists may fall short, and enter or leave the loop at will, but the community provides correction and continuity.

Thus, endeavors are not scientific just because they meet one or two criteria (or use the jargon or are done by a scientist), and they earn rejection from science less by missing a sole criterion than by reaching a certain quantity and quality of failures. Special scrutiny is called for when an inquiry is done to prove a point, is based on limited data, does not concern measurable phenomena, does not invoke material causes, does not propose falsifiable hypotheses, or depends on faith or authority rather than on observation and testing.

I think the acid test for Moreland's book is to read it holding a checklist of the aspects of science, and, whenever he cites examples of something scientific failing a standard and something nonscientific meeting it, to note that the scientific example has met or will meet most of the other criteria, whereas the nonscientific example never will.

References

Bunge, M. 1984. What is Pseudoscience? *The Skeptical Enquirer* 9(1):36-46.

Schumm, S.A. 1991. *To Interpret the Earth.* Cambridge: Cambridge University Press.

Strahler, A.N. 1987. *Science and Earth History: The Evolution/Creation Controversy.* Buffalo, NY: Prometheus Books.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Tree of Life; The Wonders of Evolution.

by Ellen Jackson, illustrated by Judeanne Winter, 1993, Prometheus Books, Buffalo, NY, 20 pp. $14.95 hardback.

Reviewed by Marie-Françoise Walk
Water Resources Research Center
University of Massachusetts, Amherst

From the earliest "silence on the Earth," this book relates the story of the origin of Earth and life, and life's evolution as a continuous process, in a simple way kids can understand.

The illustrations are all in shades of purple, which my six-year-old daughter liked—but then, that's her favorite color. The illustrations were her favorite parts, perhaps because they showed the world in a different light than usual. I would have preferred more color! And single-color ink should have made for a lower priced book.

Surprisingly to me, my daughter was somewhat disturbed by the portrayals of early hominids and other primates as her ancestors—concepts I took for granted and assumed she shared; apparently I didn't know what her schools weren't teaching her.

As a parent, I liked the author's attempt to explain how life began, not just how it evolved. Religious or not, kids need a perceptible, clear-cut way to answer teasing friends who say, "If God didn't do it, then who did?" The book emphasizes how science understands life and explains how lifelike chemical evolution happened. "Millions of years went by. The tiny, almost alive things made copies that made copies that made copies," with occasional errors/changes.

The book's science is simple or simplistic, but for a kindergarten-first grade audience, merely introducing evolution and early ancestors may be sufficient. Emphasis on life origins and selection is a brave and controversial approach in a children's book. I know that origins and evolution are not the same issue, but I appreciate a book which deals with these issues straightforwardly, in a way my daughter understands. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Correspondence

Examinism?

• *Professor Mickle ("A follow-up to 'Science or Animism,' " CIE 13:42-44) concluded from a five-question multiple-choice survey that animistic beliefs are "widespread and pervasive" among undergraduate students. But a more plausible and less disturbing interpretation of this questionnaire is possible.*

Since students were told that all answers to the survey questions would be counted as correct, some might simply have marked their answers randomly (perhaps because of exhaustion, shortness of time, or even hostility toward silly questions). But even assuming students all tried their best, they may not all have read into these questions the same meanings as Mickle. After all, this survey was appended to a biology test, apparently without any forewarning that answers would be interpreted literally as evidence of superstitious belief. Under these circumstances, we might reasonably expect some clever students to decide that each question disguised a "most-correct" science fact in figurative language.

For example, the first question of the survey asks whether the sea itself knows the location of sunken ships. But nonanimist answer E, that "the sea is incapable of knowing anything," is so stupidly obvious that it surely couldn't be the best response on a science test! Just one answer, C ("the sea has no nerves of its own"), attempts to explain, with a specific biology concept, why the sea knows nothing. It should hardly be surprising that some biology students chose this answer. And any well-read person knows that the sea is often personified. Personification is a normal, effective and respectable literary device, in which personal qualities (such as knowledge) are attributed to objects. Answers A ("chemicals of the sea come into contact with [sunken ships] and know where they are") and B ("the sea rubs over them and knows them to be there") both use personification to express, albeit poorly, the physical science idea that patterns of solutes and of turbulence may embody information about the chemistry and topography of objects on the ocean floor. Only answer D, that "There are so many sunken ships, the sea could not keep track of them all," makes no obvious scientific sense. And this answer was chosen (perhaps by mistake) by only one of more than 300 students.

Other questions could be analyzed by the student in a similar manner. Answer A in question 2, "Yes, [an automobile] tire feels the great and sudden reduction of internal pressure [when it blows out]," could be readily interpreted as just a sloppy, non-mathematical way of saying F=ma. In question 3, about whether plants can feel depressed, the popular choice D proposes

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

that plants probably are not conscious. Yet Mickle interprets even this choice as evidence of animistic thinking. Perhaps he imagines that proper science must permit no epistemological uncertainty about unmeasurable and poorly defined attributes such as consciousness? Question 4, "Is the sun in any way living?" [emphasis added], actually invites the student to define "living" as broadly as possible. In everyday language, words descriptive of life are commonly and quite correctly applied to nonbiological phenomena (e.g., "the sun's surface came alive with solar flares").

Simplistic and scientifically naive beliefs are indeed common in our society. But I see no reason to believe that many American students think a steel-belted radial, a dandelion or even old Sol might have conscious perceptions. I hope that successful science education will not require every student to abandon colorful language and adopt "scientifically correct" jargon, or else be convicted of animism. Part of the problem with evolutionists vs. creationists is that "it suits the political aims of ideologues on both "sides" to distort the nature of the conflict" (Arthur M. Shapiro, C/E 13:10-18). Mickle has illustrated how easily such distortion can arise.

David G. King, Ph.D.
Department of Anatomy
School of Medicine, and Dept. of Zoology, College of Science
Southern Illinois University, Carbondale, IL

Ed: But do bear in mind that Prof. Mickle was re-testing a 40-year old Scientific American survey, not creating his own. C/E

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a cultural and political issue, not just a problem of factual or even religious disagreement. For example, the ICR and Bible-Science Association have repeatedly taken stands on abortion and birth control issues, and in February 1994 ICR even published an article on capital punishment—a topic I would think rather far afield even for an organization fond of blaming evolution for communism, atheism, "one-worldism," fascism and crime! We have published several different surveys and ethnographic descriptions in order to present a better picture of what people are actually thinking—not just repeating the seemingly obvious fact that the number of people who reject evolution in modern industrial society is startlingly high.

John R. Cole

Complete Your Back-Issue Collection of Creation/*Evolution*

Articles cover the major areas of controversy between scientists and creationists—in science, education, law, religion and culture. Articles, book reviews, debate and correspondence aim to keep readers up to date on the latest issues in the controversy and to explain current evolutionary science for the nonspecialist.

Most new subscribers quickly order a complete set of back issues in order to have information on the major stress points in the debate readily at hand. See inside back cover for prices.

Issue 1
- Why creationism should not be taught as science—the legal issues
- Fatal flaws of flood geology

Issue 2
- Common creationist attacks on geology
- The "Omphalos" (Adam's navel) argument
- Evidence for great age of the Universe

Issue 3
- Bombardier beetle myth exploded
- Creationism—the educational issues
- Equal time for Flat Earth science

Issue 4
- Biological evolution and the 2nd Law of Thermodynamics
- Do gaps in the fossil record disprove evolution?

Issue 5
- Defining "kinds"—Do creationists apply a double standard?
- Why creationism fails to meet criteria of science

Issue 6
- Ark-eology
- Paluxy Man—the creationist Piltdown
- Misquoted scientists respond to creationists

Issue 7
- Answers to standard creationist arguments
- Victory in Arkansas

Issue 8
- Are there human fossils in the "wrong place" for evolution?
- Carbon-14 dating
- Charles Darwin Centenary tribute

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Authors' Guidelines

Submissions of manuscripts are welcome from anyone concerned with the issues that *Creation/Evolution* addresses, regardless of the author's formal academic background or profession, as long as these rules are followed:

1. Manuscripts must be typed double-spaced, including inset quotations and references. Margins must be adequate for editorial notation. Paper stock should *not* be erasable or onionskin.
2. Manuscripts should not exceed 20 double-spaced typewritten pages (shorter is better), and must be accompanied by a brief biographical note about the author's background, profession, and related interests.
3. An original and two copies should be supplied by the author. Copies will be sent to referees for evaluation with the author's name omitted. Ideally, manuscripts should be submitted on computer diskette in DOS (standard or high density 5 1/4" or 3 1/2") in WordPerfect 4.0-5.1, or ASCII formats; WordStar 3.0-5.5 and other word processor formats accepted if translatable by WordPerfect; we cannot read OS2 or Apple diskettes).
4. Reference sections are alphabetical, follow the main text, and should conform to the following sample for either books or periodicals:
   Smith, Fred Z. 1982. Geocentrism Reexamined. *Journal of Nice Things 21 (3):19-35.*
   Zubrow, Ezra 1985. Archaeoastronomy. Orlando, FL: Academic Press.
   Note: Do not abbreviate names of publications; include location of book publishers; and use the abbreviation "n.d." for undated material. Multiple entries by the same author are listed in reverse chronological order, and those in same year are listed as: 1982a and 1982b. References within text referring to reference section should be limited to author, date and page (for example, (Smith 1982:21)). Multiple references within text are listed, for example, as: (Smith 1943, 1947; Ziegler, 1983a, 1983b, 1984.) Footnotes are not encouraged; material should be incorporated into the text if possible.
5. Figures, plates, or diagrams should be submitted, when possible, in camera-ready form or provided in that form upon acceptance. Submission of these materials and of quotations by writers presumes that authors have obtained permission to use these potentially copyrighted materials.
6. Photographs should be glossy black and white prints and should be accompanied by "permissions" when appropriate.
7. Authors should retain copies of all manuscripts, photographs, and figures submitted; NCSE assumes no responsibility for materials submitted.
8. All submissions are subject to editorial correction of grammar, spelling, punctuation, and consistency as per the *Chicago Manual of Style* (and see this issue for style models).
9. Manuscripts cannot be returned unless accompanied by stamped, return-addressed envelopes. More detailed guidelines are available from NCSE or the editor (send a self-addressed stamped envelope).

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

National Center for Science Education
Creation/*Evolution*
P.O. Box 9477
Berkeley, CA 94709-0477

Nonprofit Org.
U.S. Postage
PAID
Berkeley, CA
Permit No. 1197

Address Correction Requested

Join the NCSE!

The NCSE is the national clearinghouse for scientific information on the evolution-creation controversy—a source of information for students, the media, scholars and all people concerned about sectarian attacks on science education.

Members receive four issues of *NCSE Reports* annually and two issues of *Creation/Evolution*. Discounts on books offer members 20% savings. Make checks payable in U.S. funds on a U.S. bank to the National Center for Science Education (or use MasterCard or Visa). Contributions to the NCSE are tax deductible.

	US	Foreign	Foreign Air
One year NCSE membership	$25	$32	$39
Sign me up! Enclosed is	$_____	_____	year(s)
Back issues			
NCSE Reports/Newsletter (13 vols.) ($3 per issue; $18 per vol.; 13 vols., $180)	$_____	_____	issues
C/E Journal (33 issues) (1–9, @ $6; 10+ @ $5; 33 issues, $100)	$_____	_____	issues
Shipping ($1 per issue; $.75 for each additional issue; max. of $10 for all issues)	$_____		
TOTAL	$_____		

Name _____

Address _____

City/State/Zip _____

(please print)

❒ Check ❒ MasterCard ❒ Visa Exp. Date _____

Acc't No. _____

Signature _____

NCSE • P.O. Box 9477 • Berkeley, CA 94709–0744 • (510) 526–1674
1–800–290–6006

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED